Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

[*STEEL PLATES*]

from

[*JINGYE (YINGKOU) MEDIUM PLATE CO., LTD.*]

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	EPD-IES-0020339
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The EPD is for multiple products (steel plates with different code), based on representative product.

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): *CONSTRUCTION PRODUCTS - PCR 2019:14 - VERSION 1.3.4*
PCR review was conducted by: *The Technical Committee of the International EPD System*
Life Cycle Assessment (LCA)
LCA accountability: *Yihe Yang, Aijuan Mei, Centre Testing International Group Co., Ltd. (CTI)*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Rui Wang, IVL Swedish Environmental Research Institute* Approved by: International EPD® System
OR
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☐ EPD verification by accredited certification body Third-party verification: <*name, organisation*> is an approved certification body accountable for the third-party verification The certification body is accredited by: <*name of accreditation body & accreditation number, where applicable*>
OR

Independent third-party verification of the declaration and data, according to ISO 14025:2006 via:

☐ EPD verification by EPD Process Certification*

Internal auditor: <*name, organisation*>

Third-party verification: <*name, organisation*> is an approved certification body accountable for third-party verification

Third-party verifier is accredited by: <*name of accreditation body & accreditation number, where applicable*>

*For EPD Process Certification, an accredited certification body certifies and reviews the management process and verifies EPDs published on a regular basis. For details about third-party verification procedure of the EPDs, see GPI.

Procedure for follow-up of data during EPD validity involves third party verifier:

☒ Yes ☐ No

[Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

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.

The EN 15804 method is based on the EC-JRC characterization factors as specified in EN 15804+A2. At the time of implementation, it referred to Environmental Footprint (EF) version 3.1.

Company information

Owner of the EPD:
JINGYE (YINGKOU) MEDIUM PLATE CO., LTD.

Contact:
Xiaoyu Zhang, Y905239@rgykzb.com

Description of the organisation:
JINGYE (YINGKOU) MEDIUM PLATE CO., LTD. is a professional production enterprise that covers the entire chain of steel wide and thick plates (including wire rods), and exports products to EU 27 and other parts of the world.

Name and location of production site(s):
Yejin Li, Yejin street, Laobian district, Yingkou, Liaoning, P.R.China

Product information

Product name:
Steel plates

Product identification:
ASTM international standards
EN 10025

Product description:

	code	Specifications (height * width * length)	describe
1	S275J0	（6-200）*（1200-4500）*（4000-25000）mm	Carbon structural steel, also known as ordinary carbon steel, has a carbon content of 0.06-0.22%, with less than 0.25% being the most commonly used. It has a wide limit on the content of phosphorus, sulfur, and other residual elements, and is mainly used for manufacturing engineering structural components and mechanical parts with low stress. Widely applicable to structural components such as factory buildings, bridges, ships, oil pipelines, pressure vessels, etc. Good thermal processing and cutting performance, affordable price.
2	S275J0+N		
3	S275JR		
4	ASTM A36		
5	A515 Gr.60	（6-200）*（1200-4500）*（4000-25000）mm	Mainly used in the manufacturing of medium and high temperature pressure vessels, generally used to make boilers, storage tanks, reactors, heat exchangers, heat exchangers, etc. Has good strength and welding performance.
6	A515 Gr.70		
7	A516 Gr.65	（6-150）*（1200-4500）*（4000-25000）mm	Mainly used in the construction and design of medium and low temperature pressure vessels, suitable for containers in petroleum, natural gas, petrochemical, and chemical industries. Generally used for making reactors, heat exchangers, separators, air ducts, liquefied gas tanks, boiler gas bags, and liquefied petroleum gas cylinders. It has good strength and toughness, good safety, good welding performance, and a certain degree of corrosion resistance.
8	A516 Gr.70		
9	SA-516 Gr.70		
10	ASTM A516 Gr.70		

11	A537 CL1	（6-150）*（1200-4500）*（4000-25000）mm	Widely used in industries such as petroleum, chemical, power plants, boilers, etc., it is used to produce equipment and components such as reactors, heat exchangers, separators, spherical tanks, gas tanks, liquefied gas tanks, nuclear reactor pressure shells, boiler steam drums, liquefied petroleum gas cylinders, high-pressure water pipes for hydropower stations, and turbine volumes. Good toughness, excellent welding performance, certain corrosion resistance, and wide application fields.
12	A537 CL2		
13	A572 Gr.50	（6-120）*（1200-4500）*（4000-25000）mm	Low alloy high-strength structural steel is made by adding a small number of alloying elements to carbon structural steel. It has good weldability, plasticity, toughness, and processability, good corrosion resistance, high strength, and low critical transition temperature to cold brittleness. This type of steel has advantages of high strength, good comprehensive performance, long service life, wide application range, and comparative economy compared to carbon structural steel. Widely applicable to the manufacturing of steel structures such as buildings, bridges, ships, vehicles, pipelines, high-pressure vessels, boilers, automobiles, and structural components in military engineering. It has good weldability, ductility, good processability, good corrosion resistance, and high strength.
14	A572 Gr.60		
15	A709 Gr.50		
16	S355J0		
17	S355J0+N		
18	S355J2		
19	S355J2+N		
20	Q355NC		
21	S690QL	（10-80）*（1200-3000）*（4000-13000）mm	High strength structural steel mainly refers to steel grades with a yield strength of ≥ 460Mpa. Mainly characterized by high strength, it can significantly reduce the weight of structural components. Mainly supplying equipment required by departments such as machinery, coal, transportation, mining, and various construction projects, such as drilling rigs, electric furnaces, electric wheel dump trucks, excavators, loaders, bulldozers, various lifting equipment, and coal mine hydraulic supports. High strength, good surface quality, high flatness, and easy weldability.
22	S460ML	（10-100）*（1200-3000）*（4000-25000）mm	

UN CPC code:
4121, rolled iron or steel products that have been hot rolled but not further processed

Geographical scope:
A1, A2: GLO
A3: CN
C1-C4: GLO
D: GLO

LCA information

Functional unit / declared unit:
1 metric ton (tonne) of steel plate, without package

Reference service life:
Not applicable

Time representativeness:
The reporting period is from January 2023 to December 2023, a complete calendar year
Database(s) and LCA software used:
Software: Simapro 9.6
Databases: Ecoinvent 3.10 & Ecoinvent allocation, cut-off EN15804

Description of system boundaries:
The system boundary of this study is "Cradle to gate with module C1-C4 and module D", which includes the Product stage (A1-A3), End of life stage (C1-C4), Benefits and loads beyond the system boundary (D). It does not involve the Construction process stage (A4-A5) and Use stage (B). Infrastructure/capital goods are not included within the system boundary.

Electricity:
In manufacture stage (A3), the electricity climate impact (GWP-GHG) is 1.16E+00 kg CO2 eq/kWh.

A1-A3 Cradle-to-gate:
The main raw materials and auxiliary materials are purchased externally. Iron ore powder consists of two parts: imported and domestically produced, each with corresponding transportation data.Coke and other auxiliary materials come from China. The material usage is based on enterprise specific data, which is the actual consumption in production.

The transportation data comes from enterprise’s documents such as the "Iron Ore Import Ledger" and "Coke Contract Ledger", which record the quantity and origin of the main raw materials and fuels purchased. The transportation data of other auxiliary materials will be based on database data.

The data of the production process comes from the actual measurement values of on-site activities

The database uses data from ecoinvent 3.10 and EN 15804, with priority given to the country of origin. If there is no matching data, GLO data is used.

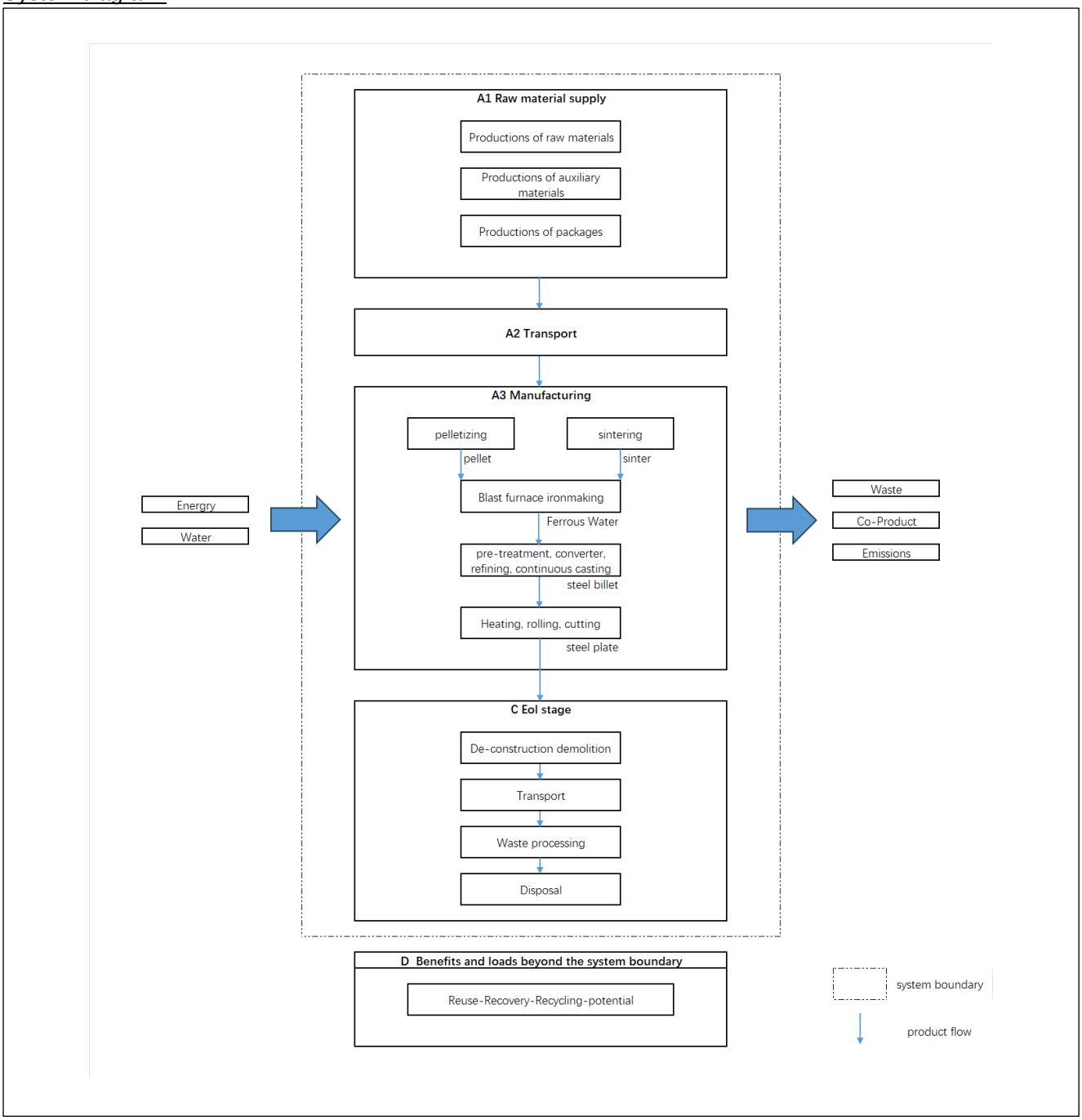
C1-C4 End of life stage:
The assumption of energy consumption in deinstallation process is taken from the scenario of a demolition process of reinforced concrete building of 1000 kg/m2 (according to Level(s)) and 10 kWh/m^2 (Bozdağ, Ö & Seçer, M. 2007). Hence, for this product, the diesel consumption is 10 kWh/ ton.

It is assumed that the transportation distance after demolition and collection is 100km. The transportation mode is Lorry > 32 metric tons, EURO6.

In this study, it is assumed that 15% of the products are landfilled for final disposal and 85% are recycled (World Steel Association, 2020). Generic data “sorting and pressing iron scrap” in the database for steel recycling processing is used for calculation.

Disclaimer: It is discouraging the use of the results of modules A1-A3 without considering the results of module C

System diagram:



More information:

Cut-off:

This study includes all 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 more than 1% of total mass and energy flows per unit process. The total neglected input flows per module is less than 5 % of energy usage and mass.

Allocation rules:

In this study, allocation is conducted in the following order:

A. Allocation should be avoided.

B. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.
C. Allocation should be based on economic values.
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	CN										GLO	GLO	GLO	GLO	GLO
Specific data used	60.33%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	4.10%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%					-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Low alloy carbon steel	1000	n.d.	0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Iron	44	4.4%	0

There are no substances contained in the product that are listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorisation” exceeding 0.1 % of the weight of the product.

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	2.74E+03	3.76E+00	1.04E+01	2.63E+01	9.38E-01	-8.43E+02
GWP-biogenic	kg CO_2 eq.	5.89E+00	4.13E-03	3.43E-04	9.91E-01	1.21E-04	2.36E+00
GWP- luluc	kg CO_2 eq.	1.07E+00	8.94E-04	4.34E-03	3.06E-02	4.87E-04	-4.02E-01
GWP- total	kg CO_2 eq.	2.74E+03	3.76E+00	1.04E+01	2.73E+01	9.39E-01	-8.41E+02
ODP	kg CFC 11 eq.	3.14E-05	5.60E-08	1.67E-07	2.97E-07	2.71E-08	-1.49E-05
AP	mol H^+ eq.	1.52E+01	4.52E-02	2.65E-02	2.64E-01	6.65E-03	-4.91E+00
EP-freshwater	kg P eq.	6.24E-01	1.95E-04	8.41E-04	1.29E-02	7.78E-05	-2.87E-01
EP- marine	kg N eq.	3.64E+00	2.02E-02	6.72E-03	6.11E-02	2.53E-03	-1.06E+00
EP-terrestrial	mol N eq.	4.01E+01	2.21E-01	7.27E-02	6.86E-01	2.77E-02	-1.20E+01
POCP	kg NMVOC eq.	1.11E+01	6.19E-02	4.01E-02	2.04E-01	9.91E-03	-3.34E+00
ADP-minerals&metals*	kg Sb eq.	4.63E-03	1.31E-05	2.93E-05	1.37E-03	1.46E-06	-1.87E-03
ADP-fossil*	MJ	2.59E+04	4.79E+01	1.56E+02	0.00E+00	2.30E+01	-1.35E+04
WDP*	m^3	2.74E+03	1.72E-01	9.74E-01	1.97E+00	1.02E+00	-1.58E+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.*

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	2.74E+03	3.76E+00	1.04E+01	2.63E+01	9.39E-01	-8.44E+02
Particulate matter	Disease incidence	2.35E-04	8.68E-08	1.02E-06	3.56E-06	1.51E-07	-1.24E-04

[1] 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 CO_2 is set to zero.

Ionizing radiation 6)	kBq U235e	6.15E+01	2.49E-02	1.38E-01	1.05E+00	1.47E-02	-1.79E+01
Human toxicity, cancer7)	CTUh	1.06E-05	9.47E-09	5.34E-08	1.95E-07	4.24E-09	-6.23E-06
Human toxicity, non-cancer7)	CTUh	2.56E-05	1.34E-08	1.03E-07	1.21E-06	4.13E-09	-1.53E-05

Resource use indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	5.81E+02	5.18E-01	2.05E+00	4.22E+01	2.13E-01	-5.72E+02
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	5.81E+02	5.18E-01	2.05E+00	4.22E+01	2.13E-01	-5.72E+02
PENRE	MJ	6.67E+03	4.79E+01	1.56E+02	7.74E-02	2.30E+01	-1.35E+04
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	6.67E+03	4.79E+01	1.56E+02	7.74E-02	2.30E+01	-1.35E+04
SM	kg	2.30E+00	1.51E-02	6.64E-02	0.00E+00	5.78E-03	-4.22E+00
RSF	MJ	4.86E-03	8.38E-05	8.44E-04	0.00E+00	1.20E-04	-1.63E-01
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	5.92E+01	4.29E-03	2.37E-02	6.26E-02	2.39E-02	-3.93E+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						

Waste indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	5.29E+01	8.78E-02	2.65E-01	1.60E+00	2.56E-02	-1.57E+02
Non-hazardous waste disposed	kg	1.60E+03	1.27E+00	4.91E+00	1.15E+01	5.84E-01	-1.72E+03
Radioactive waste disposed	kg	8.70E-03	6.12E-06	3.37E-05	0.00E+00	3.58E-06	-4.07E-03

Output flow indicators

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**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
Material for recycling	kg	2.61E-01	9.33E-03	1.17E-03	0.00E+00	1.00E-04	-2.14E-01
Materials for energy recovery	kg	2.87E-04	7.97E-07	6.93E-06	0.00E+00	4.51E-07	-1.26E-03
Exported energy, electricity	MJ	2.91E+00	7.94E-03	1.26E-02	0.00E+00	1.40E-03	-1.41E+00
Exported energy, thermal	MJ	3.30E-01	6.73E-03	1.59E-02	0.00E+00	8.98E-04	-3.77E+00

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.

Additional environmental information

The base material of the steel plate is iron. No substances required to be reported as hazardous are associated with the production of this product or Substances of Very High Concern (SVHC) for authorization published by European Chemicals Agency (ECHA).

Additional social and economic information

Not applicable

Information related to Sector EPD

the EPD is for multiple products based on representative product：

The representative product ASTM 36 steel plate is chosen to represent the steel plates, which are under the UN 4121 series produced by JINGYE (YINGKOU) MEDIUM PLATE CO., LTD.

References

General Programme Instructions of the International EPD® System. Version 4.0.
PCR 2019:14 Construction products, version 1.3.4
ISO 14025:2010 2006 Environmental labels and declarations – Type III environmental declarations Principles and procedures.
ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.
EN 15804+A2 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
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