

NIPPON STEEL | NIPPON STEEL CORPORATION

Axle



Functional unit

1 t

System boundary

final products intermediate products
 Production Stage and optional supplementary information

Main specifications of the product

Production sites : Kansai Works(Wakayama,Osaka)
 Main standards :
 SFA540,SFA590,SFA640,SFA590Q, S38C,
 EA1T,EA4T,AAR M101

Main sizes(unit mm)
 φ200 × L2400

Company Information

NIPPON STEEL CORPORATION

<https://www.nipponsteel.com/en/product/railway-automotive-machinery-parts/>

Registration#	JR-AW-24035E
PCR number	PA-180000-AW-05
PCR name	Steel products except for construction use
Publication date	11/29/2024
Verification date	09/12/2024
Verification method	Product-by-product
Verification#	JV-AW-24035
Expiration date	09/11/2029
PCR review was conducted by:	
Approval date	05/10/2023
PCR review panel chair	Yasunari Matsuno (Chiba University)

Third party verifier*

Hiroyuki Uchida

Independent verification of data & declaration in accordance with ISO14025

internal external

* Auditor's name is stated if system certification has been performed.

1. Results of life cycle impact assessment (LCIA)

Parameter	Stage	(1)+(2)+(3)	(1)+(2)	Unit
Global warming IPCC2013 GWP100a		1500	2700	kg-CO ₂ eq
Acidification		0.59	2.4	kg-SO ₂ eq
Eutrophication		0.031	0.053	kg-PO ₄ ³⁻ eq

Table Legend
 (1)Raw material supply
 (2)Production
 (3)Recycling potential
 (1)+(2):sum of (1)and(2) (cradle to gate)
 (1)+(2)+(3): sum of (1),(2)and(3) (cradle to gate with allocation for scrap recycling)

Parameter	stage	Unit	(1)+(2)	(1)	(2)	(3)
Global warming IPCC2013 GWP100a		kg-CO ₂ eq	2.7E+03	5.7E+02	2.1E+03	-1.2E+03
Ozone layer destruction		kg-CFC-11eq	1.3E-06	1.4E-07	1.1E-06	-2.2E-07
Acidification		kg-SO ₂ eq	2.4E+00	5.8E-01	1.9E+00	-1.9E+00
Photochemical ozone		kg-C ₂ H ₄ eq	4.8E-02	6.2E-03	4.2E-02	-2.6E-01
Eutrophication		kg-PO ₄ ³⁻ eq	5.3E-02	1.0E-05	5.3E-02	-2.2E-02

2. Life cycle inventory analysis (LCI)

Parameter	Unit	Unit
Non-renewable material resources	8.4E+02	kg
Non-renewable energy	3.4E+04	MJ
Renewable material resources	1.2E+03	kg
Renewable primary energy	-8.2E+02	MJ
Consumption of freshwater	3.0E+00	m ³

3. Material composition

Material	Unit	Unit
Fe	95.0	%
C	1.10	%
Si	3.00	%
Mn	3.00	%
P	0.050	%
S	0.050	%

4. Waste to disposal

Parameter	Unit	Unit
Hazardous waste	0.00E+00	kg
Non-hazardous waste.	1.0E+00	kg

*Data derived from LCA and not assigned to the impact categories of LCIA

5. Additional explanation

- Each LCI includes allocation for scrap recycling as an optional supplementary information(3) at table.1 . Recycling rate (RR) used in this calculation is 93.7% (calculated based on ISO 20915/JIS Q20915 and using Japan data in 2022 from Japan Iron and Steel Federation and Japan Steel Can Recycling Association).
- Scenarios of transport to site follow the PCR.
- Each item (except iron) in table 3 is the maximum value of all product standards covered by this EPD.However, the iron content in each product is never less than 95%, and the contents of other components are adjusted.
- Primary data collected in 2022. The source of the unit power consumption is the average of 10 electric power suppliers of Japan in 2014.
- For the transport of metallurgical coal, the amount is double counted due to the characteristics of the inventory database on which this estimation is based.

6-1. Supplementary environmental information

Each production site is certified to ISO 14001.

6-2. Regulated hazardous substances

Substance	CAS No.	Reference to standards or regulations
Manganese [Mn]	7439-96-5	Industrial Safety and Health Act
Copper [Cu]	7440-50-8	Industrial Safety and Health Act
Nickel [Ni]	7440-02-0	Industrial Safety and Health Act
Aluminum [Al]	7429-90-5	Industrial Safety and Health Act
Ferrovandium	12604-58-9	Industrial Safety and Health Act

7. Assumptions of secondary data used

The IDEA2.1.3 data and steel scrap data(JP-AJ-0001) from the Japan Iron and Steel Federation are used.

8. Remarks

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- For data quantification, please refer to PCR and Rules on quantification and declaration.
- Comparative assertion is permitted only when Rules on quantification and declaration are satisfied.
 (Reference URL : <https://ecoleaf-label.jp/regulation/>)