

**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/>

<b>Registration#</b>	JR-AW-24035E-A
<b>PCR number</b>	PA-180000-AW-05
<b>PCR name</b>	Steel products except for construction use
<b>Publication date</b>	11/29/2024
<b>Verification date</b>	09/12/2024
<b>Verification method</b>	Product-by-product
<b>Verification#</b>	JV-AW-24035
<b>Expiration date</b>	09/11/2029
<b>PCR review was conducted by:</b>	
<b>Approval date</b>	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.

Registration number : JR-AW-24035E-A

## 1. Results of life cycle impact assessment (LCIA)

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

Be sure to refer to "6-1. Supplementary environmental information" for Scope 3 and carbon footprint calculations.

Parameter	stage	Unit	(1)+(2)	(1)	(2)	(3)
Global warming IPCC2013 GWP100a		kg-CO <sub>2</sub> 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 <sub>2</sub> eq	2.4E+00	5.8E-01	1.9E+00	-1.9E+00
Photochemical ozone		kg-C <sub>2</sub> H <sub>4</sub> eq	4.8E-02	6.2E-03	4.2E-02	-2.6E-01
Eutrophication		kg-PO <sub>4</sub> <sup>3-</sup> eq	5.3E-02	1.0E-05	5.3E-02	-2.2E-02

## 2. Life cycle inventory analysis (LCI)

Parameter	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 <sup>3</sup>

## 3. Material composition

Material	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
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 LCI

## 5. Additional explanation

1. 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 SteelFederation and Japan Steel Can Recycling Association).
2. Scenarios of transport to site follow the PCR.
3. 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.
4. Primary data collected in 2022. The source of the unit power consumption is the average of 10 electric power suppliers of Japan in 2014.
5. 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.

Note on Global warming IPCC2013 GWP100a: When purchasers of this product calculate GHG emissions under GHG Protocol Scope 3, Category 1 for their organization, or when calculating the carbon footprint of products manufactured using this product, they must check the following URL:

<https://www.nipponsteel.com/en/product/cfp/certificate.html>

(The content of the above URL is not subject to EPD verification.)

### 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

1 April 2026; Additional explanatory notes added to "6-1. Supplementary environmental information".

- 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/>)