

Environmental Product Declaration



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

Average Hot Rolled Pickled & Oiled Steel

AM/NS INDIA

ArcelorMittal Nippon Steel India

from

ArcelorMittal Nippon Steel India Limited



Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
Licensee:	EPD India
EPD registration number:	EPD-IES-0012008
Publication date:	2024-08-09
Valid until:	2029-08-08
	<i>An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see www.environdec.com.</i>



General information

Programme information

Programme:	The International EPD [®] System	
Program Operator	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden	EPD India, a licensee of the International EPD [®] System www.environdecindia.com 422, Midas, Sahar Plaza Mumbai, India- 400059
Website:	www.environdec.com	
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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): *PCR 2019:14 Construction products, version 1.3.2 Published on 2023.12.08. Based on CEN standard EN 15804. CEN standard EN 15804 serve as the core PCR. UN CPC code 4123.*

PCR review was conducted by: The Technical Committee of the International EPD[®]System. See <https://www.environdec.com/about-us/the-international-epd-system-about-the-system> for a list of members.

Life Cycle Assessment (LCA)

LCA accountability: *ArcelorMittal Nippon Steel India Limited.*

LCA and EPD developer: Dr. Rajesh Kumar Singh Thinkstep Sustainability Solutions Pvt. Ltd., a Sphera Company

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: Dr. Hüdayi Kara,
Metsims Sustainability Consulting,
4 Clear Water Place, Oxford OX2 7NL, UK
Email: hudai.kara@metsims.com

Approved by: The International EPD[®] System

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 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.

Company information

Owner of the EPD: Arcelormittal Nippon Steel India Limited.

Contact: RS Sankara Subramanian,
Email: environment@amns.in

Description of the organization:

AM/NS India is a joint venture between the world's leading steel producers ArcelorMittal and Nippon Steel- is an integrated flat carbon steel manufacturer. Established in December 2019, the company's manufacturing facilities comprise ironmaking, steelmaking and downstream facilities spread across India. AM/NS India offers more than 300 grades of steel products which conform to international quality standards.

Product-related or management system-related certifications:

All facilities at AM/NS India are ISO 9001, ISO 14001 & ISO 45001 certified. In addition, Hazira unit is also certified with ISO 50001 & IATF 16949.

Name and location of production site(s):

Arcelormittal Nippon Steel India Limited
Surat-Hazira Road, Hazira, Surat - 394270, Gujarat, India



Product information

Product name: Average Hot Rolled Pickled and oiled (HRPO) Steel.

Product identification:

AM/NS India holds a key position in hot rolled pickled & oiled steel production, wide range of products from low carbon formable grade steels to high strength steels for critical applications are catered to the customers. HRPO production has an annual capacity of 1.9 MTPA.

UN CPC code: 4123.

Geographical scope: India.

Product description:

AMNS India's hot rolled pickled & oiled steel, which is manufactured in the pickling line of Hazira, Pune, Gandhidham, and Khopoli facilities. The HRPO products are available in wide range of grades like Cold Form & drawing Quality, Re-Rolling Steel, Structural Steel, etc, in thicknesses ranging from 1.6 mm to 12 mm and width from 100 mm to 1600 mm. The pickling line offers high quality products catering to various segments like automotive, white goods etc.

Manufacturing process:

Hot Rolled Pickled and oiled products are manufactured in four of AM/NS India's sites at Hazira, Pune, Gandhidham, and Khopoli. AM/NS India has Iron ore mines in Thakurani and Ghoraburhani-Sagasahi in Odisha, beneficiation plants in Kirandul and Dabuna, and pellet plants in Vizag and Paradeep, while Hazira steel plant has a Sinter plant, DRI plant, Blast furnaces along with a COREX plant, Electric Arc Furnace (EAF), CONARC, HSM, CSP mill, Pickling line, etc. The output of Pickling line is Hot Rolled Pickled and Oiled Steel. Whereas, Hot Rolled Coil from Hazira is transported and used to produce Hot Rolled Pickled and Oiled Steel in the downstream facilities available in Pune, Gandhidham, and Khopoli.

Applications:

AM/NS India's Hot Rolled Pickled and Oiled Steel have a wide number of applications. Typical applications include the use in various sectors such as Automobile, White goods, etc.

Product Range:

Size and Grades details:

Manufacturing Unit	Product	Size (mm)	Grades
Hazira	HRPO	Thickness: 1.6 - 12 Width: 900 - 1600	<ul style="list-style-type: none"> • Cold Forming and Drawing Quality • Re-Rolling Steel • MC / HC Stee • HSLA Steel • Dual Phase Steel • Hot Forming Steel • Structural Steel • Corrosion Resistant Steel • Boilers and Pressure Vessels Grades • LPV Grades
Pune	HRPO	Thickness: 1.2 mm to 4.0mm Width: 600 mm 1350 mm	<ul style="list-style-type: none"> • Cold Form & drawing Quality • Re-Rolling Steel • Structural Steel
Gandhidham	HRPO	Thickness 1.6 -5.0 Width - 900- 1600	<ul style="list-style-type: none"> • HR2 / HR4 / E34 / HSLA 355 / Fe410
Khopoli	HRPO	Thickness: 1.60 - 5.0 Width:100 - 1550	<ul style="list-style-type: none"> • HR2 / HR4 / E34 / HSLA 355 / Fe410

LCA information

Functional unit / declared unit: 1 Tonne (1000 kg) AM/NS India's Average Hot Rolled Pickled and Oiled Steel

Reference service life: Since products of that kind are not normally replaced during the service life of a building, it has been assumed that reference service life is equal to estimated Service Life of building or the structure of intended use.

Time representativeness: The collection of foreground data refers to January 2022 to December 2022.

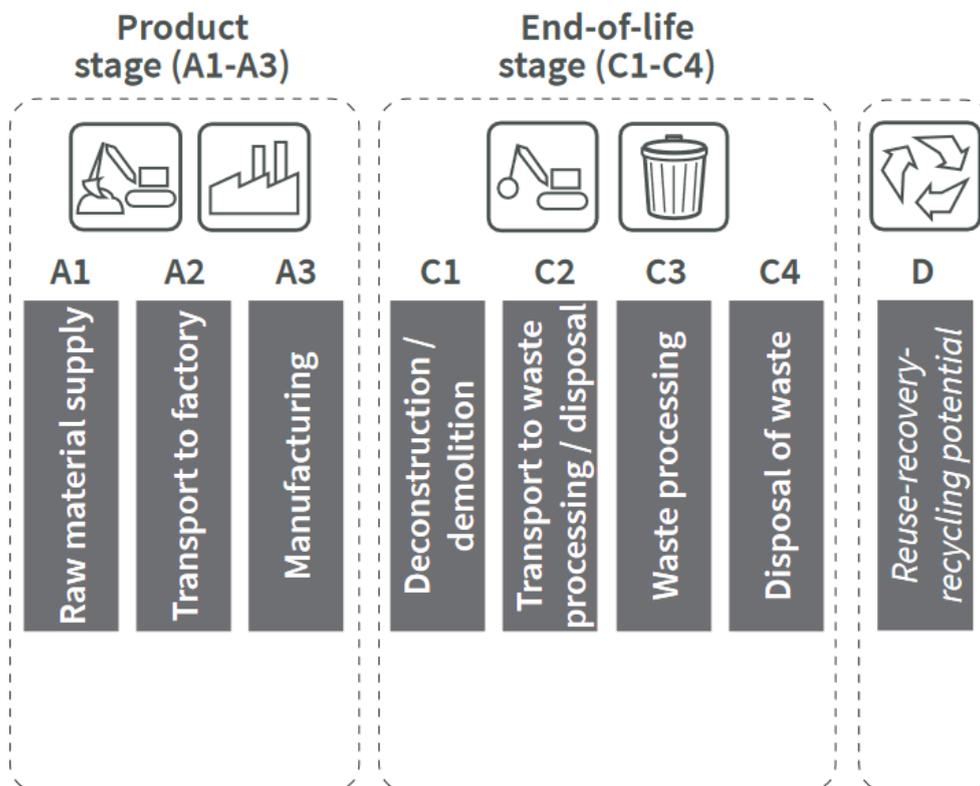
Database(s) and LCA software used:

The background data has been taken from the latest available Sphera Managed LCA Content (MLC) 2023.2 and the LCA model was created using Sphera's LCA for Experts (LCA FE) software, version 10.7.

Description of system boundaries:

The system boundary: It includes cradle to gate stage with additional modules A1-A3, C1-C4, and module D.

Reference package used: EN 15804 reference package based on EF 3.1.



- *Module A1 to A3:*

The product stage includes provision of all materials, products and energy, as well as waste processing up to the end-of waste state or disposal of final residues during the product stage. The electricity in AM/NS India Hazira facility has been sourced from a mix of Grid, Captive power plant (CPP), and solar photovoltaics. The emission factor of the electricity mix for the GWP-GHG indicator is 0.882 kg CO₂eq./kWh. The electricity in all the downstream facilities, i.e., Pune, Gandhidham and Khopoli has been sourced majorly from the grid. There is no packaging considered in the present assessment.

- *Module C1 to C4:*

Within this EPD, the modules C1-C4 are included. These modules consider the dismantling of the considered product (C1), the transportation of the dismantled components to their End of Life (EoL) destination (C2), the waste processing for recovery or recycling (C3) as well as the disposal (C4), if given. At EoL, the steel material leaves the product system in C3 for recycling in Module D. The considered EoL scenario for the steel material is 88% recycling and 12% landfill.

Category	Subcategory	Unit	Quantity
Collection process	Collected separately	kg	1000
	Collected with mixed construction waste	kg	0
Recovery	Reuse	kg	0
	Recycling	kg	880
	Landfill	kg	0
	Incineration	kg	0
	Incineration with energy recovery	kg	0
	Energy conversion efficiency rate	kg	0
Disposal	Material for final disposal	kg	120
Transport	Deconstruction site to scrap processing plant	km	0
	Scrap processing plant to site for end of waste	km	50

- *Module D:*

Module D includes any declared benefits and loads from net flows leaving the product system that have not been allocated as co-products and that have passed the end-of-waste state in the form of reuse, recovery and/or recycling potentials.

Metals are assumed to reach the end of waste status directly at the construction site. The treatment as well as net benefits and loads of reuse or recycling potentials (for the net scrap amount only) are grouped to module D.

In the EoL net scrap approach (Amount of steel recycled at EoL – Scrap input from previous product life cycles) has been used. The environmental burden for the extra scrap used in the manufacturing has been considered in module D.

Data quality assessment and declaration:

Process	Source type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1- A3
Manufacturing of product	Collected data	EPD owner	2022	Primary data	53.55%
Generation of electricity used in manufacturing of product	Database and collected data	Sphera MLC 2023.2 and EPD owner	2022	Primary data	26.13%
Transport of raw materials to the manufacturing site	Database	Sphera MLC 2023.2	2022	Primary data	4.74%
Total share of primary data, of GWP-GHG results for A1-A3					84.42%

Note: The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that do not capture all relevant aspects of data quality. The indicator is not comparable across product categories.

Cut-off criteria:

The environmental impact of the product studied has been assessed by considering all significant processes, materials, and emissions. Excluded flows are assumed to have a negligible impact, contributing less than 5% to the cumulative impact assessment categories. The production of capital equipment, facilities, and infrastructure required for manufacture has not been considered.

Data quality and sources:

Data quality is compliant with ISO 14025:2006. All primary data were collected for the year 2022. All background data come from the Sphera MLC 2023.2.

Allocation:

With any multi-product system, allocation rules are defined to relate the system inputs and outputs to each of the products. Several methods are documented in ISO 14040:2006 and ISO Technical Report 14049. The main co-products for Blast furnace, COREX plants, Electric Arc Furnace, and CONARC are allocated.

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

	Production			Installation		Use Stage							End-of-Life				Next product system
	Raw material supply	Transport to manufacturer	Manufacturing	Transport to building site	Installation into building	Use / application	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport to EoL	Waste processing for reuse, recovery, recycle	Disposal	Reuse, recovery, or recycling
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	NR	NR	NR	NR	NR	NR	NR	NR	NR	X	X	X	X	X
Geography	India												GLO	GLO	GLO	GLO	GLO
Specific data used	84.42%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	0%																
Variation – Sites	<10%																

X- Module declared. NR- Not reported.

Content information

Material Properties in Average Hot Rolled Pickled and Oiled Steel

Product Components	Weight	Post-consumer recycled material, weight-% of product	Biogenic material, weight-% of product	Biogenic material, kg C/ product or declared unit
Steel	1000 kg	1.8	0	0
Iron	>96%		0	0
C	0.0005 - 0.99%		0	0
S	0 - 0.90 %		0	0
P	0 – 0.20 %		0	0
Mn	0 - 3.00 %		0	0
CE	0 - 0.99 %		0	0
Total	100%		0	0

Products do not contain any substances that can be included in “Candidate List of Substances of Very High Concern for Authorization” and raw materials used are not part of the EU REACH regulation.

Results of the environmental performance indicators

The environmental performance of the functional unit of one metric tonne of AM/NS India Average Hot Rolled Pickled and Oiled Steel are reported below using the parameters and units as specified in PCR 2019:14 v1.3.2.

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.

Mandatory impact category indicators according to EN 15804+A2:2019

Results per 1 Tonne of Average Hot Rolled Pickled and Oiled Steel							
Impact indicators	Unit	A1-A3	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	2.68E+03	0.00E+00	4.29E+00	0.00E+00	1.78E+00	-1.50E+03
GWP-fossil	kg CO ₂ eq.	2.68E+03	0.00E+00	4.29E+00	0.00E+00	1.78E+00	-1.50E+03
GWP-biogenic	kg CO ₂ eq.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO ₂ eq.	1.30E+00	0.00E+00	5.43E-05	0.00E+00	5.60E-03	-1.99E-01
ODP	kg CFC -11 eq.	1.29E-08	0.00E+00	6.50E-14	0.00E+00	4.58E-12	-2.01E-09
AP	Mole of H ⁺ eq.	1.40E+01	0.00E+00	6.24E-03	0.00E+00	1.28E-02	-3.67E+00
EP- freshwater	kg P eq.	1.39E-03	0.00E+00	8.80E-07	0.00E+00	3.63E-06	-3.49E-04
EP- marine	kg N eq.	3.11E+00	0.00E+00	1.72E-03	0.00E+00	3.30E-03	-5.89E-01
EP- terrestrial	Mole of N eq.	3.42E+01	0.00E+00	1.95E-02	0.00E+00	3.63E-02	-5.28E+00
POCP	kg NMVOC eq.	8.84E+00	0.00E+00	4.83E-03	0.00E+00	9.97E-03	-2.39E+00
ADPE	kg Sb eq.	8.25E-04	0.00E+00	2.26E-08	0.00E+00	8.33E-08	-4.48E-04
ADPF	MJ	3.30E+04	0.00E+00	5.85E+01	0.00E+00	2.40E+01	-1.49E+04
WDP	m ³ world equiv.	2.27E+02	0.00E+00	4.92E-03	0.00E+00	1.98E-01	-1.01E+02
Acronyms	Caption: GWP - total = global warming potential; GWP - fossil = global warming potential (fossil fuel only); GWP - biogenic = global warming potential (biogenic); GWP - luluc = global warming potential (land use only); ODP = ozone depletion; AP = acidification terrestrial and freshwater; EP freshwater = eutrophication potential (freshwater); EP - marine = eutrophication potential (marine); EP- terrestrial = eutrophication potential (terrestrial); POCP = photochemical ozone formation; ADPE = abiotic depletion potential (element); ADPF = abiotic depletion potential (fossil); WDP = water scarcity.						

Additional mandatory and voluntary impact category indicators

Results per 1 Tonne of Average Hot Rolled Pickled and Oiled Steel							
Impact indicators	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG*	kg CO ₂ eq.	2.67E+03	0.00E+00	4.27E+00	0.00E+00	1.78E+00	-1.49E+03
Acronyms	GWP-GHG*= global warming potential (greenhouse gases) This indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide emissions and uptake and biogenic carbon stored in the product with characterization factors (CFs) based on IPCC (2013)						

Resource use indicators according to EN 15804+A2:2019

Results per 1 Tonne of Average Hot Rolled Pickled and Oiled Steel							
Impact indicators	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	5.46E+03	0.00E+00	5.70E-02	0.00E+00	3.91E+00	-5.88E+02
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	5.46E+03	0.00E+00	5.70E-02	0.00E+00	3.91E+00	-5.88E+02
PENRE	MJ	3.30E+04	0.00E+00	5.85E+01	0.00E+00	2.40E+01	-1.49E+04
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	3.30E+04	0.00E+00	5.85E+01	0.00E+00	2.40E+01	-1.49E+04
SM	kg	1.75E+01	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	7.85E+00	0.00E+00	1.55E-04	0.00E+00	6.06E-03	-2.51E+00
Acronyms	Caption: PERE = Use of renewable primary energy excluding the renewable primary energy resource used as raw materials; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding the non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water						

Output flows & Waste Indicators according to EN 15804+A2:2019

Results per 1 Tonne of Average Hot Rolled Pickled and Oiled Steel							
Impact indicators	Unit	A1-A3	C1	C2	C3	C4	D
HWD	kg	7.75E-07	0.00E+00	5.06E-12	0.00E+00	5.23E-10	-1.11E-07
NHWD	kg	2.74E+01	0.00E+00	8.23E-04	0.00E+00	1.20E+02	-1.80E+01
RWD	kg	1.21E-01	0.00E+00	6.48E-06	0.00E+00	2.73E-04	-1.63E-03
MFR	kg	0.00E+00	0.00E+00	0.00E+00	8.80E+02	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acronyms	Caption: HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy						

Additional environmental performance indicators according to EN 15804+A2:2019

Results per 1 Tonne of Average Hot Rolled Pickled and Oiled Steel							
Impact indicators	Unit	A1-A3	C1	C2	C3	C4	D
PM	Disease incidences	2.64E-04	0.00E+00	3.88E-08	0.00E+00	1.57E-07	-3.44E-05
IR	kBq U235 eq.	1.13E+01	0.00E+00	5.89E-04	0.00E+00	3.16E-02	-3.36E+00
ETF	CTU _e	6.80E+03	0.00E+00	2.43E+01	0.00E+00	1.51E+01	-7.82E+02
HTP-c	CTU _h	3.40E-07	0.00E+00	3.97E-10	0.00E+00	2.02E-09	-6.12E-08
HTP-nc	CTU _h	9.33E-06	0.00E+00	8.44E-09	0.00E+00	2.13E-07	-2.92E-06
SQP	Pt	2.83E+03	0.00E+00	5.79E-02	0.00E+00	5.83E+00	-1.93E+02
Acronyms	Caption: PM = Particulate matter emissions; IR = Ionising radiation, human health; ETF= Eco-toxicity (freshwater); HTP-c = Human toxicity, cancer effects; HTP-nc = Human toxicity, non-cancer effects; SQP = Soil quality potential/Land use related impacts						

References

- General Programme Instructions of the International EPD® System. Version 4.0.
- PCR 2019:14. Construction Products, Version 1.3.2
- Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data; CEN/TR 15941:2010
- EN 15804: EN 15804:2012+A2:2019: Sustainability of construction works -Environmental Product Declarations - Core rules for the product category of construction products.
- EN ISO 14025: EN ISO 14025:2011-10 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- EN ISO 14040: EN ISO 14040:2009-11 Environmental management - Life cycle assessment - Principles and framework
- EN ISO 14044: EN ISO 14044:2006-10 Environmental management - Life cycle assessment - Requirements and guidelines.
- LCA FE: LCA FE Software System and Database for Life Cycle Engineering, Sphera Solution GmbH, Leinfelden-Echterdingen, 2024 (<https://sphera.com/solutions/product-stewardship/life-cycle-assessment-software-and-data/managed-lca-content/>)
- WSI and Eurofer's Co-Product Allocation Methodology 2014 – A methodology to determine the LCI of Steel Industry Co-products.
- World Steel Association- CO₂ Data Collection User Guide, Version 9 (May 2019).