ENVIRONMENTAL PRODUCT **DECLARATION**

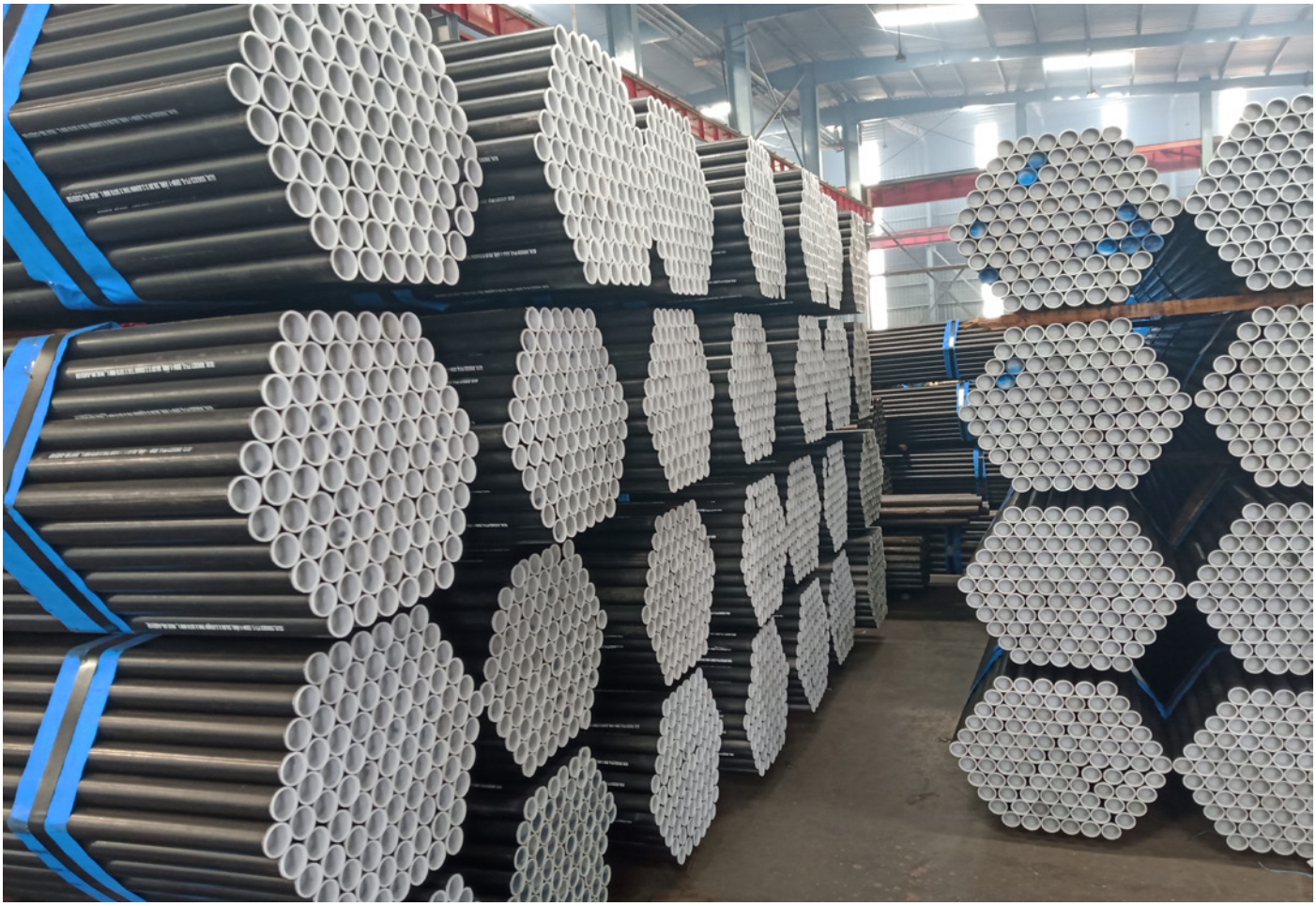
In accordance with ISO 14025 & EN 15804:2012 + A2:2019

ERW Offline Annealing Steel Pipes

BF Routed Steel

from

Goodluck India Limited



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The International EPD® System
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Programme Information

Programme	The International EPD® System
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Information about verification and reference PCR:

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product category rules (PCR)
PCR 2019:14 Construction products (EN 15804:A2) Version 1.1

PCR review was conducted by
The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members.
Review chair: Claudia A. Peña, University of Concepción, Chile.
The review panel may be contacted via the Secretariat www.environdec.com/contact.

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

☐ EPD Process verification ☑ EPD verification

Third party verifier
Vladimír Kočí, PhD
Šárecká 5, 16000 Prague 6, Czech Republic

Approved by
International EPD System Technical Commiee, supported by the Secretariat

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

☐ Yes ☑ No

LCA Study & EPD Design Conducted by

SEMTRIO

Semtrio Sustainability Consulting
BUDOTEK Teknopark, No 8/27
Umraniye / Istanbul Turkey
www.semtrio.com

Good Luck India Limited. has the sole ownership, liability, and responsibility for the EPD.
EPDs within the same product category but from different programmes may not be comparable.EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

Company Information

Owner of the EPD

Goodluck India Limited
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Goodluck India Limited, established in 1986, is an ISO 9001:2015 certified organization, engaged in manufacturing and exporting of a wide range of galvanized sheets & coils, towers, hollow sections, CR coils CRCA and pipes & tubes. Leveraging on advanced manufacturing facilities and engineering expertise, the company has been successfully catering to the needs of clients from Public sector, Private sector OEMs and Central & State Government Departments. The company has successfully garnered the trust of most reputed global clients from across 100 countries.

Good Luck India Limited is a diversified engineering company with over three decades of experience in manufacturing of Auto Tubes, Engineering Structures, Forgings and Cold Rolled value added products. We have started journey with the capacity of 12000 MTPA in 1987 to now processing above 2.24 lakhs MT with more than 2000 employee strength.

We are highly diversified company and having around 27% export and 73% domestic business of our total business.

The company made a strategic shift to move from regular low margins products to Value added high margin products. In line with this strategy, we have also entered new sectors such as Auto tube, Solar, Transmission and Distribution Towers.

We are well-positioned to benefit from the strong focus on infrastructure development under the current government.

Apart from Infra, our country has seen tremendous growth in auto mobile industry. We are supplying auto tubes and auto accessories to major auto and auto component companies. We expect that Government support towards “Make in India”.

Good Luck India is committed to deliver innovative, user friendly and better-quality products at the best value to customers. Keeping this in mind, we continuously update and modernize our plant.

We have very strong relations with our clients, and we export to almost 450 customers around the world. Our supplies are made to over 100 countries around the world.

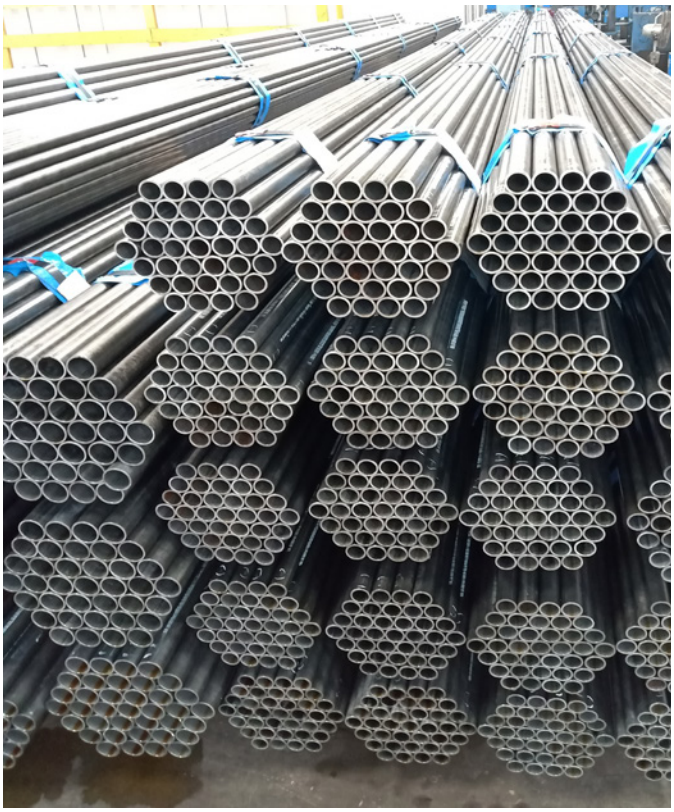
Production Site

Goodluck Metallics
(A Unit of Goodluck India Limited)
Village - Sikra, Taluka-Bhachau (Kutch),
Gujarat - 370140 INDIA

Product Information

Product Name

ERW Offline Annealing Steel Pipes



If desired by the customer, offline annealing process can be done after producing the bare pipes. These pipe types are produced to increase durability to be used in different areas of use.

Water Pipes
It is generally used in the transmission and distribution of non-flammable light gases and liquids. It is used in applications such as water installation lines, light gas lines, fire safety lines, water well lines, sleeve manufacturing, elbow manufacturing, greenhouse constructions, and irrigation systems.

Length: 3.0 - 12.0 m

Industrial Pipes
It is used in sectors and applications such as construction structures, automotive, machine manufacturing, scaffolding and formwork, conveyor, rack systems, roof systems, furniture, piles and tunnels.

Scaffolding Pipes
It is used in scaffolding and formwork structures.

Boiler Pipes
It is used for the transmission of non-combustible and non-explosive liquids at high temperature and pressure.

Threaded end, Bevel end, Plain end and Groove end Pipes.
It is used in all installation and construction areas of coupled connections.

Heat-Treated and Hot-Finished Pipes
It is used in all constructions with its mechanical properties and improved grain structure by cold forming and heat treatment.

Product Information

Technical Specifications

Pipe Types / End Application	Production Standards	Steel Grades
Water and Gas Pipes	EN 10217-1	P195TR1, P235TR1, P265TR1, P195TR2, P235TR2, P265TR2
	EN 10255	S195T
	ASTM A53	Grade A, Grade B
	ASTM A795	Grade A, Grade B
	IS 1239 P-1	
	SLS 829	
	BS 1387	
	AS 1074	
Industrial Tubes and Pipes	EN 10219	S235JRH, S275J0H, S355JOH
	EN 10305-3	E155, E190, E195, E220, E235, E260, E275, E320, E355
	ASTM A500	Grade A, Grade B, Grade C, Grade D
	IS 3074	ERW-1,ERW-2&ERW-3
	IS 3601	WT 160, WT 210, WT 240 & WT 310
	AS/NZS 1163	C250, C350, C450, C250L0, C350L0
Boiler, Super heater and Air preheater tubes/ pipes Heat-Treated	EN 10217-2	P195GH, P235GH, P265GH
	ASTM-A 178/A 178M – 02	Grade A
	ASTM A 423/A 423M	Grade 1
	Indian boiler regulation-1950	
	BS 3059-P1	GR- 320

Technical Specifications (cont.)

Pipe Types / End Application	Production Standards	Steel Grades
Boiler, Super heater and Air preheater tubes/ pipes Heat-Treated	BS 3059-P2	GR- 320, GR-360
	BS 6323 P-5	ERW-1, ERW-2, ERW-3, ERW-4 & ERW-5
Hollow Steel Sections for Structural	IS 4923	YSt. 210, YSt 240, YSt 310 & YSt 355
	ASTM A500	Grade A, Grade B, Grade C, Grade D
	AS/NZS 1163	C250, C350, C450, C250L0, C350L0
	EN 10219	S235JRH, S275J0H, S355JOH
Threaded Pipes	ASTM A53, ISO 7/1, ANSI B1.20.1, EN 10255, IS 1239 P-1, AS 1074,SLS 829	
Heat-Treated and Hot-Finished Pipes	EN 10217 P-1	P195TR2, P235TR2, P265TR2
	ASTM A53	Grade A, Grade B
	ASTM A500	Grade A, Grade B, Grade C, Grade D
	IS 3074	ERW-1, ERW-2 & ERW-3
Conduit Pipes	UL-6, UL-797, UL-1242, ASNZS-61386.21, ASNZS-2053.7	-

LCA Information

Functional Unit
1 tonne (1000kg) of fabricated steel product manufactured in Gujarat facilitate (IN).

Reference service life
Not applicable.

Time representativeness
The production data in this LCA study represents the period of May 2021 and January 2022.

Database(s) and LCA software used
SimaPro v9.2 and Ecoinvent v3.7.1

Description of system boundaries
Cradle to gate (A1-3) with options, modules C1-C4, module D.

Data quality and data collection
According to EN 15804:2012+A2:2019 specific data was used for module A3 (Processes the manufacturer has influence over) and was gathered from Goodluck Metallics (A Unit of Goodluck India Limited) plants. Specific data includes actual product weights, amounts of raw materials used, product content, energy consumption, transport figures, water consumption and amounts of wastes. For A1 and A2 modules, according to EN 15804:2012+A2:2019, generic data was applied and was obtained from Ecoinvent v3.7.1

Allocation
Mass allocation has been applied for preconsumer recycled materials according to EN 15804:2012+A2:2019.

Cut-off rules
Life Cycle Inventory data for a minimum of 99% of total inflows to the life cycle assesment have been included and a cut-off rule of 1% regarding energy, mass and environmental relevance was applied. Impacts caused by treatment operations have been calculated lower than 1% environmental relevance.

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

	Product Stage			Construction Process Stage		Usa Stage							End of Life Stage				Resource Recovery Stage
	Raw Material Supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintanence	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction	Transport	Waste processing	Disposal	Raw Material Supply
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	IN	-	-	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	>99.5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation- products	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-sites	Not relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Product Information

System Diagram

SYSTEM BOUNDARY

A1
Hot Rolled Steel Coil Other Raw Material

A2
Transport

A3
ERW Welding Annealing

Product Stage

C1
De-construction

C2
Transport to waste processing

C3
Waste processing

C4
Disposal - Landfill

End of Life Stage

D
Resource Recovery Stage

Description of Declared Modules

A1 - Raw Materials Supply
This stage takes into account raw material extraction, processing and energy used in the production process.

A2 - Transport to the Manufacturer
This stages include transportation of the raw materials from supplier to factory gate. Transportation types are considered as road, railroad, etc.

A3 - Manufacturing
This stage includes energy and water consumption during the manufacturing process. Additionally, packaging materials are covered by this stage. Followed production processes are as;

- Electric Arc Furnace
- LF Steel Making
- Hot Strip Rolling
- HFIW - ERW
- Coating

C1 - De-construction
The dismantling of steel pipe has a very low impact considering the impact throughout the life of the installation. It is assumed that, in C1 module, same electricity and diesel is consumed as during the construction installation of steel pipe.

C2 - Transport to Waste Processing
An average distance of 100 km has been assumed for the transport to recycling facility. Transport is calculated on the basis of a scenario with the parameters described in the table below.

Parameters C2 Module	
Transport by road	Lorry > 32 metric ton
Distance (km)	100
Database	Ecoinvent v3.7.1

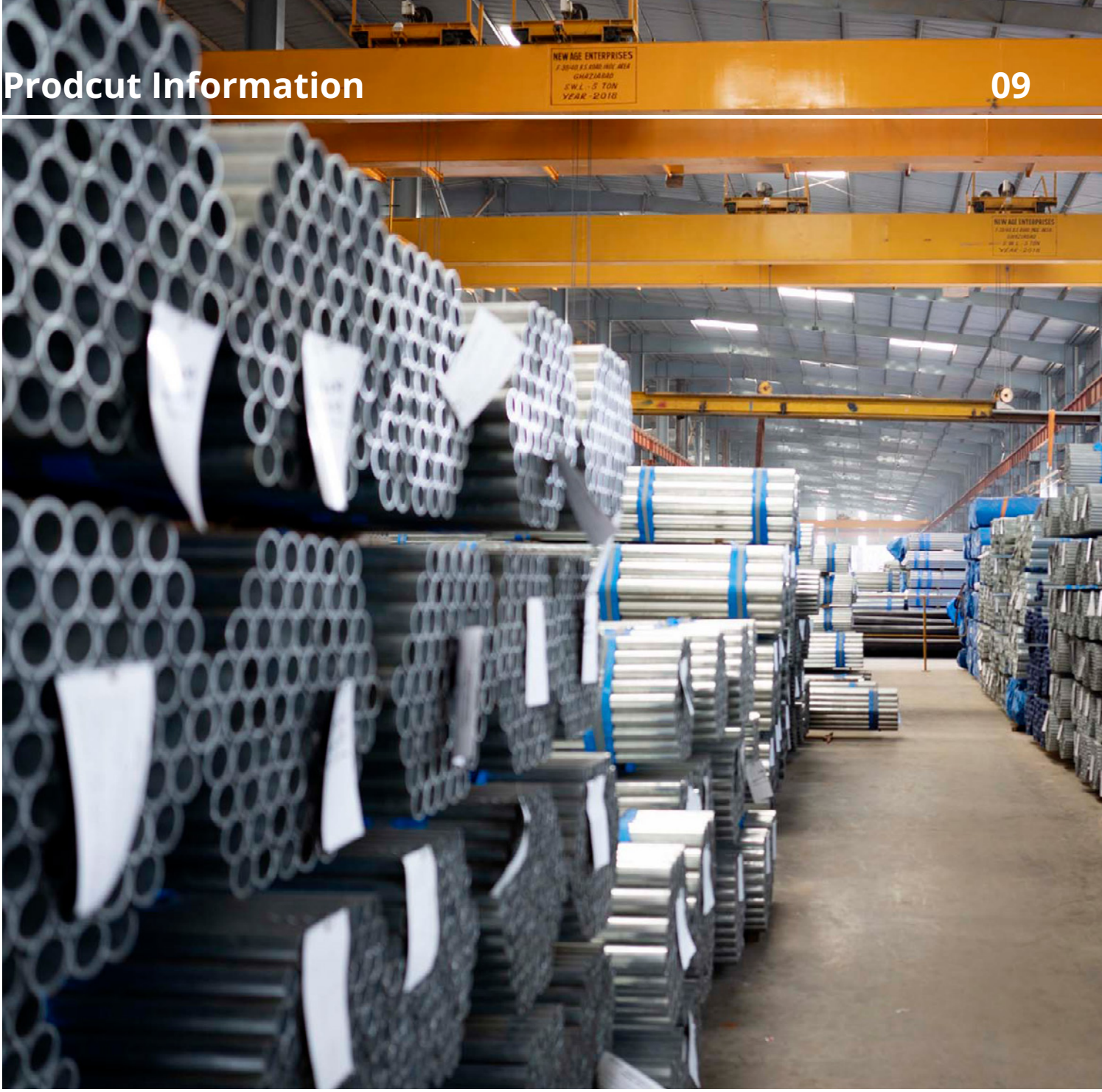
C3 - Waste processing for reuse, recovery and/or recycling
The material and energy expenses required for Module C3 are negligible. It is assumed that there is no sorting or processing required for steel pipes.

C4 - Final disposal
100% of used product after the lifetime will be collected and recycled into the manufacturing system. It is assumed that 5% of the product is lost during de-constructionand recycling, and, 95% is reached to recycling system.

D - Reuse, Recovery or Recycling Potential
Scrap inputs to the production stage are substracted from scrap to be recycled at end of life in order to obtain the net scrap output from the product system. This remaining net scrap is then delivered to recycling process. Module D reports the environmental aspects of recycled scrap generated at the end of life minus that used at the production stage.

Information on which life cycle stages are not considered
This EPD only cover the Cradle to Gate A1-3, C1-4 and D stages because other stages are very dependent on particular scenarios and are better developed for specific building or construction works.

Prodcut Information



Content Declaration

Content declaration of 1000kg of steel pipe	
Material	**Share**
BF steel coil	99.0-99.9.%
Coating materials	1-0.01%
Renewable material	0 %
Biogenic Carbon	0 %

* The product does not content “Candidate List of Substances of Very High Concern (SVHC)” compounds.

Potential Environmental Impact *Mandatory Indicators According to EN 15804*

Results for 1000kg of ERW Pipe							
Indicator	**Unit**	**A1:A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq	2545	1.62	8.97	0	0.262	-1319
GWP-biogenic	kg CO_2 eq	-8.72	0.010	0.016	0	8.13E-04	4.50
GWP-luluc	kg CO_2 eq	1.04	2.08E-03	2.74E-03	0	7.12E-05	-0.521
GWP-total	kg CO_2 eq	2538	1.63	8.99	0	0.263	-1315
ODP	kg CFC-11 eq	1.36E-04	7.33E-08	2.12E-06	0	1.08E-07	-6.76E-05
AP	mol H+ eq	13.2	7.68E-03	0.029	0	2.48E-03	-7.45
EP-Freshwater	kg PO_4^{3-} eq	1.67	8.92E-04	3.20E-03	0	3.32E-04	-0.979
EP-Aquatic Freshwater	kg P eq	0.166	8.80E-05	7.89E-05	0	2.76E-06	-0.099
EP-Marine	kg N eq	2.98	1.63E-03	6.45E-03	0	8.60E-04	-1.72
EP-Terrestrial	kg N eq	27.4	0.016	0.072	0	9.47E-03	-15.0
POCP	kg NMVOC eq	14.2	5.52E-03	0.028	0	2.75E-03	-8.47
ADP-minerals & metals*	kg Sb eq	4.60E-03	9.24E-06	2.15E-05	0	5.87E-07	-2.62E-03
ADP-fossil	Mj	32718	19.5	143	0	7.35	-16977
WDP	m^3	661	1.02	0.530	0	0.330	-199

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-aquatic freshwater** = *Eutrophication potential, fraction of nutrients reaching aquatic 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.

Environmental Performance

Potential Environmental Impact *Additional Mandatory and Voluntary Indicators*

Results according to PCR2019:14 for 1000 kg of ERW Pipe							
Indicator	**Unit**	**A1:A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq	2456	1.56	8.88	0	0.258	-1267
Results according to EN 15804+A2 for 1000 kg of ERW Pipe							
PM	[disease inc]	2.16E-04	4.12E-07	7.70E-07	0	4.84E-08	-1.36E-04
IRP	[kBq U235 eq]	40.9	0.071	0.604	0	0.030	-18.9
ET-freshwater	[CTUe]	94525	40.3	119	0	4.62	-57503
HT-cancer	[CTUh]	2.04E-05	3.57E-08	3.38E-09	0	1.38E-10	-1.37E-05
HT-non-cancer	[CTUh]	8.68E-05	3.45E-08	1.15E-07	0	2.88E-09	-5.63E-05
SQP	[pt]	9113	5.10	162	0	15.4	-4783

Acronyms

GWP-GHG = *Global Warming Potential total excl. biogenic carbon following IPCC AR5 methodology*; **IRP =** *Ionizing radiation, human health*; **ET-freshwater =** *Eco-toxicity (freshwater)*; **HT-cancer =** *Human toxicity, cancer effects*; **HT-non-cancer =** *Human toxicity, non-cancer effects*; **SQP =** *Potential soil quality index (SQP)*

1 The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Use of Resources

Results according to PCR2019:14 for 1000 kg of ERW Pipe							
Indicator	**Unit**	**A1:A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	1239	1.88	1.55	0	0.059	-623
PERM	MJ	0	0	0	0	0	0
PERT	MJ	1239	1.88	1.55	0	0.059	-623
PENRE	MJ	34648	20.7	152	0	7.81	-17910
PENRM	MJ	0	0	0	0	0	0
PENRT	MJ	34648	20.7	152	0	7.81	-17910
SM	kg	1047	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0
FW	m^3	139	0.144	0.123	0	0.012	-64.6

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 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*

Waste Production

Results according to PCR2019:14 for 1000 kg of ERW Pipe							
Indicator	**Unit**	**A1:A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	0	0	0	0	0	0
Non-hazardous waste disposed	kg	55.2	0	0	0	0	0
Radioactive waste disposed	kg	0	0	0	0	0	0

Output Flows

Results according to PCR2019:14 for 1000 kg of ERW Pipe							
Indicator	**Unit**	**A1:A3**	**C1**	**C2**	**C3**	**C4**	**D**
Component for re-use	kg	0.062	0	0	0	0	0
Materials for recycling	kg	0	0	0	0	950	0
Materials for energy recycling	kg	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0
Radioactive waste disposed	MJ	0	0	0	0	0	0

References

ISO 14020:2000
Environmental labels and declarations — General principles

ISO 14040:2006
Environmental management — Life cycle assessment — Principles and framework

ISO 14044:2006
Environmental management — Life cycle assessment — Requirements and guidelines

ISO 14025:2006
Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804:2012+A2:2019
Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction product

The International EPD® System
www.environdec.com

The International EPD® System The General Programme Instructions v3.01

The International EPD® System PCR 2019:14 Construction products v1.1 (EN 15804:A2)

_ Ecoinvent 3.7
www.ecoinvent.org

_ SimaPro LCA Software
www.simapro.com

_ GoodLuck India Limited
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