ENVIRONMENTAL PRODUCT DECLARATION

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

The International EPD®
Programme operator: The International EPD® System – India Regional Hub
Registration number: **S-P-12000**

EPD® THE INTERNATIONAL EPD® SYSTEM

INDIA EPD® THE INTERNATIONAL EPD SYSTEM

EPD VERIFIED

ECO PLATFORM EPD VERIFIED

VERSION 01

Date of publication:
2024/05/02

Validity:
5 years

Valid until:
2029/05/01

Scope of the EPD®:
India & Southeast Asia

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

Manufacturer: Saint-Gobain India PVT Ltd. – Vetrotech Business

VDS® Curtain Wall

SAINT-GOBAIN

Table of Contents

General information

Company & EPD information

Manufacturer: Saint-Gobain India Pvt. Ltd. - Vetrotech Business, No. 18/3, 7th Floor, Sigapi Aachi Building, Rukmani Lakshmipathi Rd, Egmore, Chennai, Tamil Nadu 600008
Production plant: Vetrotech Saint-GobainPlot A-1, Sipcot Industrial Park, Kancheepuram, Tamil Nadu – 602105
Management system-related certification:
ISO 9001:2015 Valid till 07/09/2025
ISO 45001:2018 Valid till 07/09/2025
ISO 14001:2015 Valid till 07/09/2025
Programme used: The International EPD® System. More information at www.environdec.com
PCR identification: The International EPD® System PCR 2019:14 version 1.3.2 for Construction Products EN 15804 Sustainability of construction works. And with reference to Institut Bauen und Umwelt e.V. PCR Guidance-Texts for Building-Related Products and Services, Part B: Requirements on the EPD for Structural steels
UN CPC CODE: 421 – Fabricated Metal Products
Owner of the declaration: Saint-Gobain India Private Limited Plot A-1, Sipcot Industrial Park, Kancheepuram, Tamilnadu – 602105
Product name and manufacturer represented: VDS® Curtain Wall Partition manufactured in Saint-Gobain Vetrotech PVT ltd.
EPD® prepared by: Sreekavya Vadapalli (Saint Gobain Research India, Sreekavya.Vadapalli@saint-gobain.com)
Geographical scope of the EPD®: India and South-east Asia
EPD® registration number: S-P-12000
Declaration issued: 2024/05/02 valid until: 2029/05/01
Demonstration of verification: an independent verification of the declaration was made, according to ISO 14025:2010. This verification was external and conducted by the third-party verifier mentioned below based on the PCR mentioned above.
Framework: The LCA is based on 2022 production data for one site in India.
The Declared Unit is: 1 m of installed VDS® Curtain Wall for Engineered steel window or Curtain Wall frames weighing 5.17 kg/m and a useful life of 30 years to provide a fire-resistive and High Security System with complete design flexibility
Declaration of Hazardous substances: (Candidate list of Substances of Very High Concern): Under 0.1%
Geographical scope of the EPD®: India & Southeast Asia
The intended use of this EPD is for B2B communication.

Programme information

PROGRAMME:	The International EPD® System
ADRESS:	EPD International AB - Box 210 60 - SE-100 31 Stockholm - Sweden
WEBSITE:	www.environdec.com , www.environdecindia.com
E-MAIL:	info@environdec.com

CEN standard EN 15804:2012 + A2:2019 serves as the Core Product Category Rules (PCR)

Product category rules (PCR): PCR 2019:14 version 1.3.2 for Construction Products

PCR review was conducted by: The Technical Committee of the International EPD® System See www.environdec.com for a list of members.

President: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact - Contact via info@environdec.com

Life cycle assessment (LCA)

LCA accountability: Sree Kavya Vadapalli, Saint-Gobain Research India

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

☐ EPD process certification ☒ EPD verification

Third party verifier:

Sunil Kumar C S,
Ivory 501, HM World City, JP Nagar 9th Phase, J. P. Nagar, Raghavana Palya, Karnataka 560108
sunilkumar@chakra4.in

Approved by: The International EPD© System

Procedure for follow-up of data during EPD validity involves third part verifier: ☐ Yes ☒ No

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."

Product information

Product description and description of use

This Environmental Product Declaration (EPD®) describes the environmental impacts of **one meter (1 m) of installed VDS® Curtain Wall system weighing 5.17 kg/m which provides fire-resistance and High Security Solutions with complete design flexibility.**

VDS® by Forster Profile Systems are certified in compliance to EN 1363-1, 1363-2, Standard Test Method Requirements for Fire Tests of Materials used in Building Construction.
EN 1364-3 specify the method for determining the fire resistance of non-load bearing Elements /Curtain wall.
EN 1627-1630 Burglar Resistance classifications using test methods for determination of resistance under static loading, dynamic loading, and manual Burglary attempts.
EN 1522/1523 Bullet Resistance Classification test methods.
EN 13123-1, EN13124-1 Explosion Resistance Classification test methods.

PRODUCT DESCRIPTION	VDS® Fixed Partitions	VDS® Curtain Wall Partition	VDS® Curtain Wall
Weight(kg/m)	3.43	2.7	5.17
Mass density (g/Cm3)	7.8	7.8	7.8
Thickness (mm)	50	75-150	75-150
Width (m)	2000	60.5	60.5
Length (m)	2400	6	6
Product use	Partition	Partition	Curtainwall
Reaction to fire	EW	EW	EW
Thermal conductivity	45 W/(MK)	45 W/(MK)	45 W/(MK)

Technical data/physical characteristics:

Criteria	Actual Performance	Conformance Standard
Fire Resistance	Upto 120 Minutes	EN 13501-2
Resistance to wind load	Upto 3 kN/m2 (Positive) Upto 3 kN/m2 (Negative)	EN 13116
Air Permeability	Upto AE	EN 12152
Water Tightness	Upto RE 1200	EN 12154
Impact Resistance	Upto E5/I5	EN 14019

Declaration of the main product components and/or materials

All raw materials contributing more than 5% to any environmental impact are listed in the following table.
VDS® Curtain Wall:

Product components/materials	Weight (%)	Biogenic material weight-% and kg C/kg (%)
Hot Dipped Galvanized Steel	80-90%	0
Chloroprene Gasket	5 – 10 %	0
Clamping profile	5-10%	0

Dry Powder	0-5%	0
Sum	**100%**	0
Packaging materials	**Weight (%)**	**Weight biogenic carbon kg C/kg**
Bubble wrap	0-1%	0
Cellotapes	0-1%	0
Cardboard	1-5%	0.013
Wooden Crate	5-10%	0.023
Paper for Label	5-10%	0

During the life cycle of the product, no hazardous substance listed in the “Candidate List of Substances of Very High Concern (SVHC) for authorization” has been used in a percentage higher than 0,1% of the weight of the product. The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

LCA calculation information

TYPE OF EPD	Cradle to grave and module D
FUNCTIONAL UNIT	**1 m of installed VDS® Curtain Wall weighing 5.17 kg/m and a useful life of 30 years for Engineered steel window or Curtain Wall frames to provide a fire-resistive and High Security System with complete design flexibility**
SYSTEM BOUNDARIES	Cradle to grave + Module D = A + B + C +D
REFERENCE SERVICE LIFE (RSL)	The Reference Service Life (RSL) of the VDS® Curtain Wall product is 30 years. This value of 30 years is the expected lifespan of the product without refurbishment and corresponds to the standard building design life.
CUT-OFF RULES	In the case that there is not enough information, the process energy and materials representing less than 1% of the whole energy and mass used can be excluded (if they do not cause significant impacts). The addition of all the inputs and outputs excluded cannot be bigger than 5% of the whole mass and energy used, as well as of the emissions to environment. Flows related to human activities such as employee transport are excluded. The construction of plants, production of machines and transportation systems are excluded since the related flows are supposed to be negligible compared to the production of the building product when compared at these systems lifetime level.
ALLOCATIONS	Allocation criteria are based on mass. The polluter pays principle as well as the modularity principle have been followed.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Scope: **India & Southeast Asia** Data is representative of one production site Sriperambudur located in India Data is representative of the year 2022
BACKGROUND DATA SOURCE	Databases GaBi 2022 and ecoinvent v.3.8
SOFTWARE	GaBi 10

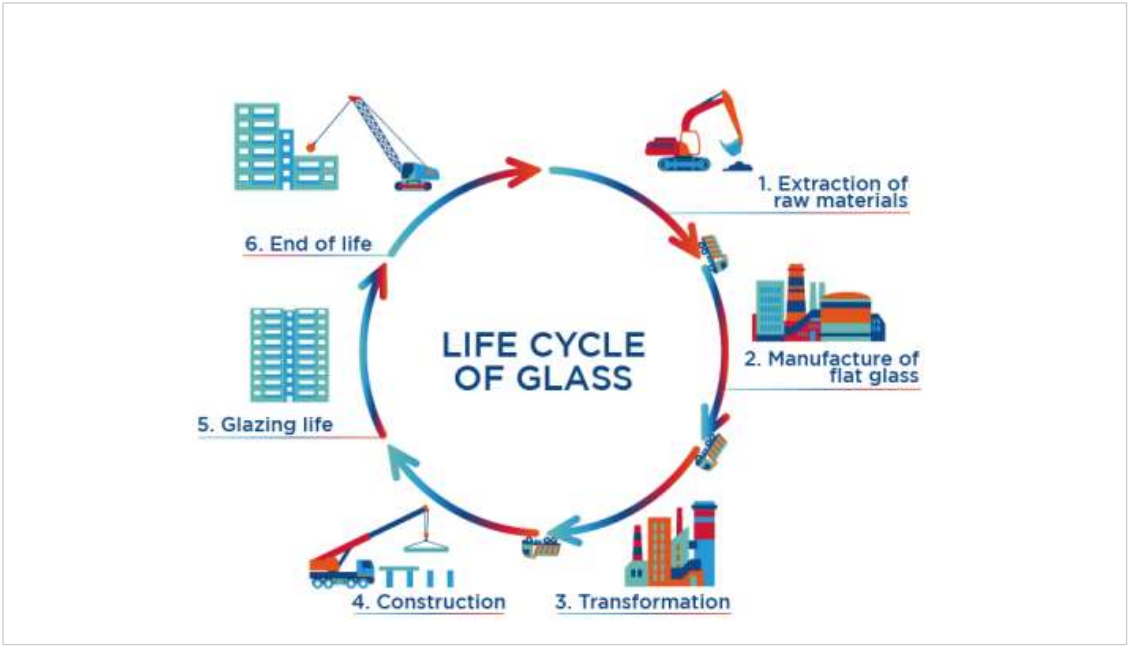
According to EN 15804:2012+A2:2019, EPDs of construction products may not be comparable if they do not comply with this standard. According to ISO 21930: 2017 EPDs might not be comparable if they are from different programmes.

LCA scope

System boundaries (X=included. MND=module not declared)

	PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	Raw material supply	Transport	Manufacturing	Transport	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-recovery
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	GLO	GLO	IN	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO
Specific data used	<5% GWP- GHG																
Variation products	0%																
Variation sites	0%																

Life cycle stages



A1-A3, Product stage

Description of the stage: The product stage is subdivided into 3 modules A1, A2 and A3 respectively Raw material supply, Transport to the manufacturer and “Manufacturing”.

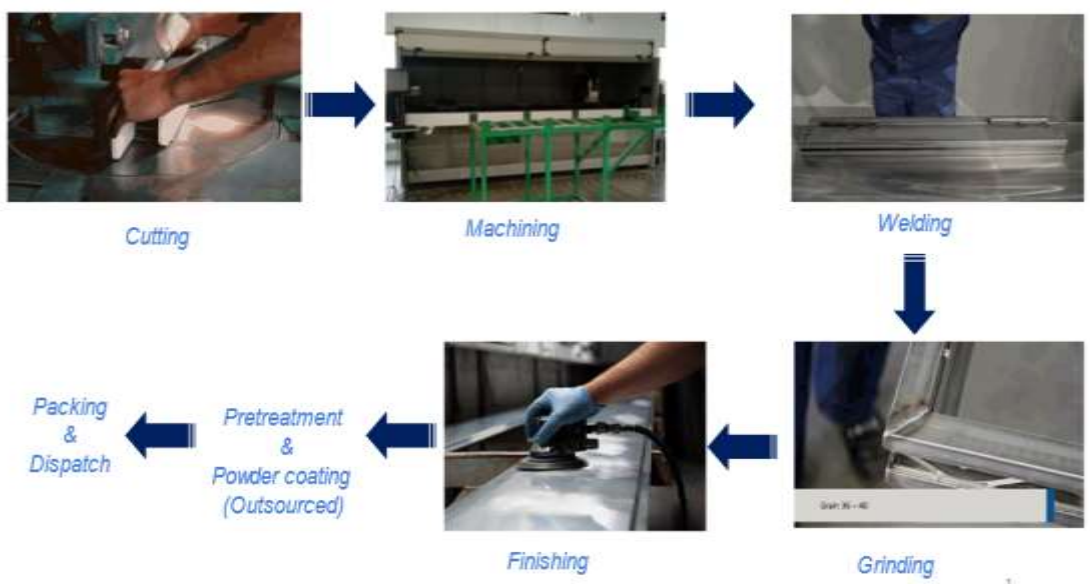
A1, Raw materials supply
This module includes the extraction and transformation of raw materials and packaging.

A2, Transport to the manufacturer
This module includes the transportation of raw materials and packaging to the manufacturing site. The modelling includes road, boat and/or train transportations.

A3, Manufacturing
This module includes the manufacturing of products. The processing of any waste arising from this stage is also included.

Manufacturing process flow diagram

System diagram:



Manufacturing in detail:

The raw materials are cut to the required sizes as per the approved drawing given by customer, it is machined to created provisions to mount the hardware. After inspection of the machined component the profiles and assembled as per the manufacturing diagram and welded together. Welded component is ground of the excess weld bead, and it is finished with sanding pads to remove surface defects. It is then subjected to inspection followed by transportation to Powder coating facility where it is treated with chemicals to remove surface contaminants and make the surface effective for powder adhesion. Post chemical treatment the Electrostatically charged powder is sprayed on the component followed by heating to complete the polymerisation process. The powder coated components are inspected and packed to be dispatched to the customers.

A4-A5, Construction process stage

Description of the stage: The construction process is divided into 2 modules: A4, Transport to the building site and A5, Installation in the building.

A4, Transport to the building site

This module includes the transport from the manufacturing site to the building site. Transport is calculated based on a scenario with the parameters described in the following table.

PARAMETER	VALUE
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Freight truck, maximum load weight of 27.9 t, real load of 24 t and consumption of 0.38 liters per km
Distance	1012 km
Capacity utilisation (including empty returns)	85% (30% empty returns)
Bulk density of transported products*	7850 kg/m^3
Volume capacity utilisation factor	1

PARAMETER	VALUE
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	heavy fuel oil driven, cargo container ship, 5.000 to 200.000 dwt payload capacity for deep sea transport
Distance	5584 km
Dead Weight Tonnage	52.134 DWT
Bulk density of transported products	7850 kg/m3
Volume capacity utilisation factor	1

A5, Installation in the building

This module includes the installation materials and the management and processing of waste generated during the installation. The parameters are presented in the following table.

PARAMETER	VALUE/DESCRIPTION
Ancillary materials for installation (specified by materials)	None
Water consumption	None
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	Electricity: 0.007 KWh/kg (Fixed Partition) 0.005 KWh/kg (Curtain Wall) 0.009 KWh/kg(Curtain Partition)
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	VDS Framing losses: 26 kg/t (2.6%) Packaging: 2.89 kg/t (5%)
Output materials (specified by type) as results of waste processing at the building site e.g., of collection for recycling, for energy recovering, disposal (specified by route)	Metal scraps are considered 85% recycled and 15% landfilled Plastic straps are landfilled. Wooden bearers and cardboard corners are landfilled. Metal strips are landfilled.
Direct emissions to ambient air, soil, and water	None

B1-B7, Use stage (excluding potential savings)

Description of the stage: The use stage is divided into the following modules:

- B1, Use
- B2, Maintenance
- B3, Repair
- B4, Replacement
- B5, Refurbishment
- B6, Operational energy use
- B7, Operational water use

Description of the scenarios and additional technical information:
The product has a reference service life of 30 years. It is assumed that the product will last in situ with no requirements for maintenance, repair, replacement, or refurbishment throughout this period. Therefore, it has no impact at this stage.

C1-C4, End of Life Stage

Description of the stage: This stage includes the following modules:

- C1, Deconstruction, demolition: The de-construction and/or dismantling of the product take part of the demolition of the entire building. For the studied product, a small amount of energy is considered 0.05 MJ/m² (Reference: PEFCRs for products in buildings, Debacker et al., 2012)
- C2, Transport to waste processing
- C3, Waste processing for reuse, recovery and/or recycling
- C4, Disposal, including provision and all transport, provision of all materials, products and related energy and water use.

Description of the scenarios and additional technical information for the end of life:

PARAMETER	VALUE/DESCRIPTION
Collection process specified by type	5.17 kg collected with mixed deconstruction and demolition waste (including metal profile)
Recovery system specified by type	4.39 kg for recycling (metal frame) (85% frame)
Disposal specified by type	0.7755 kg to landfill(15% frame and 100% packaging)
Assumptions for scenario development (e.g. transportation)	The Frames are recycled by sorting and remelting

(Reference: 2017 worldsteel LCI methodology report Section 3.6.2)

D, Reuse/recovery/recycling potential

This module includes the loads and benefits resulting from reuse, energy recovery or recycling beyond the system boundary

Disclaimer:

The use of the results of modules A1-A3 (A1-A5 for services) without considering the results of module C is not encouraged because module C is included in the EPD

LCA results

As specified in EN 15804:2012+A2:2019 and the Product-Category Rules, the environmental impacts are declared and reported using the baseline characterization factors from the PEF (EF 3.1). Specific data has been supplied by the plant, and generic data come from GaBi and ecoinvent databases.

All emissions to air, water, and soil, and all materials and energy used have been included.

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

All figures refer to a declared unit of 1m of installed VDS® Curtain wall with a weight of 5.17 kg/m and a useful life of 30 years.

The following results corresponds to a single product manufactured in a single plant:

Environmental Impacts

Environmental Indicators	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				REUSE, RECOVERY RECYCLING
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Climate Change [kg CO2 eq.]	1.81E+01	8.26E-01	1.52E+00	0	0	0	0	0	0	0	2.30E-02	1.54E-02	1.10E-02	1.01E-02	-6.94E+00
Climate Change (fossil) [kg CO2 eq.]	1.82E+01	8.22E-01	4.99E-01	0	0	0	0	0	0	0	2.29E-02	1.53E-02	1.10E-02	1.16E-02	-6.66E+00
Climate Change (biogenic) [kg CO2 eq.]	-9.93E-02	1.39E-04	1.02E+00	0	0	0	0	0	0	0	2.34E-05	3.57E-05	-1.14E-04	-1.52E-03	-2.85E-01
Climate Change (land use change) [kg CO2 eq.]	1.66E-02	3.90E-03	4.81E-04	0	0	0	0	0	0	0	4.37E-07	1.44E-04	8.46E-05	3.39E-05	-3.36E-03
Ozone depletion [kg CFC-11 eq.]	7.13E-07	6.46E-14	1.98E-08	0	0	0	0	0	0	0	1.77E-15	1.36E-15	1.88E-14	4.36E-17	-4.96E-09
Acidification terrestrial and freshwater [Mole of H+ eq.]	1.68E-01	1.47E-02	4.67E-03	0	0	0	0	0	0	0	3.61E-05	9.21E-05	5.87E-05	8.44E-05	-1.49E-02
Eutrophication freshwater [kg P eq.]	5.94E-03	1.63E-06	1.56E-04	0	0	0	0	0	0	0	4.44E-09	5.68E-08	3.83E-08	2.02E-08	5.60E-05
Eutrophication marine [kg N eq.]	2.60E-02	3.51E-03	1.32E-03	0	0	0	0	0	0	0	1.25E-05	4.50E-05	2.69E-05	2.17E-05	-3.81E-03
Eutrophication terrestrial [Mole of N eq.]	4.52E-01	3.86E-02	1.22E-02	0	0	0	0	0	0	0	1.38E-04	4.99E-04	2.97E-04	2.39E-04	-3.89E-02
Photochemical ozone formation - human health [kg NMVOC eq.]	8.97E-02	9.96E-03	2.63E-03	0	0	0	0	0	0	0	3.78E-05	8.48E-05	7.31E-05	6.58E-05	-1.18E-02
Resource use, mineral and metals [kg Sb eq.][1]	4.26E-03	3.10E-08	1.11E-04	0	0	0	0	0	0	0	2.32E-10	1.01E-09	1.20E-08	1.06E-09	-1.73E-07
Resource use, energy carriers [MJ][1]	2.64E+02	1.07E+01	7.19E+00	0	0	0	0	0	0	0	3.05E-01	2.12E-01	2.21E-01	1.54E-01	-4.98E+01
Water deprivation potential [m³ world equiv.][1]	7.15E+00	5.53E-03	1.97E-01	0	0	0	0	0	0	0	5.90E-05	1.80E-04	2.19E-03	1.23E-03	-8.91E-02

[1] The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Resources Use

Resources Use Indicators	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				D REUSE, RECOVERY, RECYCLING
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Use of renewable primary energy (PERE) [MJ]	2.94E+01	4.27E-01	8.06E-01	0	0	0	0	0	0	0	1.35E-03	1.50E-02	2.06E-02	2.02E-02	1.36E+01
Primary energy resources used as raw materials (PERM) [MJ]	6.11E+00	0.00E+00	-1.91E-01	0	0	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0	0
Total use of renewable primary energy resources (PERT) [MJ]	3.54E+01	4.27E-01	6.14E-01	0	0	0	0	0	0	0	1.35E-03	1.50E-02	2.06E-02	2.02E-02	1.36E+01
Use of non-renewable primary energy (PENRE) [MJ]	2.64E+02	1.07E+01	7.19E+00	0	0	0	0	0	0	0	3.06E-01	2.12E-01	2.22E-01	1.54E-01	-5.03E+01
Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	1.80E+00	0.00E+00	4.67E-02	0	0	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (PENRT) [MJ]	2.66E+02	1.07E+01	7.24E+00	0	0	0	0	0	0	0	3.06E-01	2.12E-01	2.22E-01	1.54E-01	-5.03E+01
Input of secondary material (SM) [kg]	2.68E-01	0	6.98E-03	0	0	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels (NRSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of net fresh water (FW) [m3]	1.76E-01	4.75E-04	4.84E-03	0	0	0	0	0	0	0	2.19E-06	1.65E-05	6.32E-05	3.89E-05	-4.14E-03

Waste Category & Output flows

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				D REUSE, RECOVERY, RECYCLING
Waste Category & Output Flows	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Hazardous waste disposed (HWD) [kg]	2.16E-09	3.69E-11	1.14E-10	0	0	0	0	0	0	0	8.82E-13	7.86E-13	-5.74E-13	2.35E-09	-1.27E-10
Non-hazardous waste disposed (NHWD) [kg]	4.37E-01	1.28E-03	3.19E-02	0	0	0	0	0	0	0	6.33E-05	3.06E-05	5.83E-05	7.76E-01	-9.97E-02
Radioactive waste disposed (RWD) [kg]	1.34E-03	1.33E-05	3.73E-05	0	0	0	0	0	0	0	3.53E-07	2.75E-07	2.98E-06	1.76E-06	8.82E-04
Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for Recycling (MFR) [kg]	3.37E-01	0	1.23E-01	0	0	0	0	0	0	0	0	0.00	4.39E+00	0	0
Material for Energy Recovery (MER) [kg]	0	0	0.0233	0	0	0	0	0	0	0	0	0	0	0	0
Exported electrical energy (EEE) [MJ]	0	0	2.33E-02	0	0	0	0	0	0	0	0	0	0	0	0
Exported thermal energy (EET) [MJ]	0	0	2.33E-02	0	0	0	0	0	0	0	0	0	0	0	0

Additional voluntary indicator (GWP total without biogenic CO_2)

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				REUSE, RECOVERY RECYCLING
Environmental Indicators	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Climate Change [kg CO2 eq.][2]	1.82E+01	8.22E-01	4.99E-01	0	0	0	0	0	0	0	2.29E-02	1.53E-02	1.10E-02	1.16E-02	-6.66E+00

[2] 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.

Information on biogenic carbon content

	PRODUCT STAGE
Biogenic Carbon Content	**A1 / A2 / A3**
Biogenic carbon content in product [kg]	0
Biogenic carbon content in packaging [kg]	1.95E-01

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

The product does not contain any biogenic carbon. Regarding packaging, biogenic carbon is quantified due to wooden crates and cardboard usage.

LCA results interpretation

Global Warming Potential (Climate Change) (GWP)
The majority of contribution to this environmental impact is from the production modules (A1-A3). This is primarily because the sources of greenhouse gas emissions are predominant in this part of the life cycle. The CO_2-intensive blast furnace steel greatly contributes to this value. CO_2 is also generated upstream from the production of electricity. We can see that other sections of the life cycle also contribute to the GWP; however, the production modules contribute to around 90% of the contribution. Combustion of fuel in transport vehicles will generate the second highest percentage of greenhouse gas emissions together with the waste during the installation stage.

Non-renewable resources consumptions
The consumption of non – renewable resources is once more found to have the highest value in the production modules. Due to coke, diesel and natural gas consumption within the factory. For non – renewable fuels such as coal and oil are used to generate electricity during manufacturing. The contribution to this impact from the other modules is very small and primarily due to the non – renewable resources consumed during installation.

Energy Consumptions
Modules A1-A3 have the highest contribution to total energy consumption. Energy in the form of electricity, natural gas or other fossil energy is consumed in a vast quantity during the manufacture of steel product so we would expect the production modules to contribute the most to this impact category.

Water Consumption
Water is used within the manufacturing facility and the steel production plant. Therefore, we see the highest contribution in the production phase.

Waste Production
Waste production does not follow the same trend as the above environmental impacts. The largest contributor is the end-of-life module. Despite an important recycling a ratio, there is still some amounts of landfilled materials. There is also an impact associated with the production module, since we do generate waste on site, the impact associated with installation is due to the loss rate of product during implementation.

Additional information:

Electricity information

TYPE OF INFORMATION	DESCRIPTION
Location	Representative of residual production in India
Geographical representativeness	average national or region-specific electricity mix including main activity producers and auto producers as well as electricity imports
Reference year	2019
Type of dataset	Cradle to gate from Sphera databases
Source	**SPHERA-ts database**
CO_2 emission kg CO_2 eq. / MJ	1.06– based on climate change fossil indicator

Data quality

Inventory data quality is judged by geographical, temporal, and technological representativeness. To cover these requirements and to ensure reliable results, first-hand industry data crossed with LCA background datasets were used. The data was collected from internal records and reporting documents from 2022. After evaluating the inventory, according to the defined ranking in the LCA report, the assessment reflects good inventory data quality.

References

1. ISO 14040:2006 Environmental Management-Life Cycle Assessment-Principles and framework.
2. ISO 14044:2006 Environmental Management-Life Cycle Assessment-Requirements and guidelines.
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6. EPD International. General Program Instructions (GPI) for the International EPD® System (version 4.0) www.environdec.com.
7. The International EPD System PCR 2019:14 version 1.3.2 for Construction Products for Construction Products
8. European Chemical Agency, Candidate List of substances of very high concern for Authorization. http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.as
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