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Global GreenTag
International EPD Program

EPD™

Environmental Product Declaration
In accordance with ISO 14025 and EN 15804

TIANJIN YUANTAI DERUN PIPE MANUFACTURING GROUP CO., LTD.

Yuantai Derun Steel Hollow Sections

Company Address: DAQIUZHUANG INDUSTRIAL Area, JINGHAI, TIANJIN, CHINA
Issue Date: 03/11/2026
Valid To: 03/11/2031
Registration Number: TIA:TI01:2026:EP

ECO PLATFORM

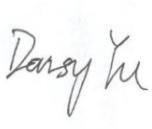
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1. General Information

Product Category Rules (PCR)	CEN standard EN 15804+A2 2019 serves as core Product Category Rules (PCR) (07 2022) (1)			
Sub-PCR	Product Category Structural Steel Sub-PCR SIS: 2024 V1			
Verification Statement	Independent verification of the declaration and data, according to ISO 14025:2010 ☐ Internal ☑ External Independent external verification of the declaration and data, mandatory for business-to-consumer communication according to ISO 14025:2010			
	Signature	**Name**	**Details**	**Logo**
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EPD Owner		Daisy Yu	Tianjin Yuantai Derun Pipe Manufacturing Group Co.,Ltd. Daqiuzhuang Industrial Area, Jinghai, Tianjin, China yuantai@yuantai-steel.com http://www.yuantai-steel.com	YUANTAI
Communication	This EPD can be used for business-to-consumer (B2C) and business-to-business (B2B) communication.			
Comparability	EPD of construction products may not be comparable if they do not comply with EN 15804			
Geographical Area	The product is produced in China. The main market is South America, across parts of Africa, the Middle East, Australia, South East Asia, Europe and East Asia. The end of life of the product occurs in these countries. In this study, it is assumed that the end-of-life of the product occurs in Global.			
Life Cycle Assessment (LCA)-method Cut-off Classification	Complies with EN 15804+A2:2019. Conventional production waste gas (not generated by combustion fuel) were cut-off, due to the weight is very small and the statistics are not precise.			
Characterisation Factors Version	EF Reference Package 3.1. See JRC website for more information European Platform on LCA | EPLCA (europa.eu)|			
Electricity mix	Consumption mix(State Grid)			

2. Product Information – Average Product



Figure 1 Product Image

Product Group Statement	This an EPD that covers a product group and uses average data.
Product Ranges Represented	Low carbon steel hollow section, mild steel hollow section, low alloy steel hollow section. Including Q195, Q235, Q275, Q355, Q420, Q460
Manufacturing plants included	Tianjin Yuantai Derun Pipe Manufacturing Group Factory in Tianjin
Production Site Locations	No.1 Science and Technology Road, Daqiuzhuang Industrial Area, Jinghai, Tianjin, China
Calculation Rules	Since the process flow of the target products is highly similar, the input and output data at the factory level are first divided according to the corresponding production ratios of different product series to the target products, and then divided by the production volume of the target product (kg) to obtain the elementary flow.
Geographical Coverage	For production stage(A1-A3): China For EOL stage(C1-C4): Global
Relevant Products	All series Q195, Q235, Q275, Q355, Q420, Q460 of steel hollow section
Representativeness of Calculations	It represents the annual average of the target product series.
Description of Manufacturing Processes	Steel hollow sections are produced from continuously supplied steel strip which is delivered to the manufacturing plant in coils. The strip is first levelled, trimmed and formed to the required feed width. It is then introduced into a progressive roll-forming line which shapes the material from flat strip into a closed tubular profile. The hollow profile is subsequently calibrated to the required square geometry by a series of forming rollers. The longitudinal seam of the tube is welded in a continuous welding process (typically high-frequency resistance welding). Excess weld flash is removed automatically during line passage. Dimensional accuracy and weld quality are continuously monitored by integrated measuring and testing systems. The hollow sections are cut to the ordered manufacturing length on a flying saw system. After cutting, the sections are subjected to calibration and straightness control. Product identification and traceability are maintained at every stage of the production process through heat/batch numbering and dimensional marking. Section bundles are assembled for handling and transport. Ancillary packaging elements (such as steel straps, protective dunnage and pallet supports) are used solely for transport reasons and are not part of the construction product.

Product Performance and Standard compliance	**Standard**	**Result**
	ASTMA500	Grade A, Grade B, Grade C, Grade D
	ASTMA501	Grade A, Grade B
	AS1163	C250, C350, C450, C250L0, C350L0, C450L0
	EN10219	S235JRH/J0H/J2H, S275JRH/J0H/J2H, S355JRH/J0H/J2H/K2H, S275NH/NLH, S355NH/NLH, S420NH/NLH/MH/MLH, S460NH/NLH/MH/MLH
	EN10210	S235JRH/J0H/J2H, S275JRH/J0H/J2H, S355JRH/J0H/J2H/K2H, S275NH/NLH, S355NH/NLH, S420NH/NLH/MH/MLH, S460NH/NLH/MH/MLH
	GB/T	Q195, Q235B/C/D, Q275B/C/D, Q355B/C/D/E, Q420B/C/D/E, Q460B/C/D/E
	EN 10255	S195T
	EN 10225	S355G13 (+N & +QT), S355G15 (+N & +QT), S420G5 (+QT), S460G5 (+QT)
	JISG3466	STKR400, STKR490
	DIN2240	St 33, St 37.0, St 44.0, St 52.0
	Updated technical information can be found on the http://www.yuantai-steel.com	
Candidate List of Substances of Very High Concern for Authorisation	Contains no substances in the "Candidate List of Substances of Very High Concern for authorisation" registration with the European Chemicals Agency	

Materials	Material Name	Composition of Q195	Composition of Q235	Composition of Q275	Composition of Q355	Composition of Q420	Composition of Q460
	Iron	≥98%	≥97%	≥97%	≥96%	≥96%	≥96%
	Cabon	≤0.12%	≤0.22%	≤0.24%	≤0.22%	≤0.20%	≤0.20%
	Manganese	≤0.5%	≤1.4%	≤1.5%	≤1.6%	≤1.7%	≤1.8%
	Silicon	≤0.30%	≤0.35%	≤0.35%	≤0.55%	≤0.55%	≤0.55%
	Chromium	-	-	-	≤0.30%	≤0.30%	≤0.30%
	Nickel	-	-	-	≤0.50%	≤0.80%	≤0.80%
	Sulphur	≤0.04%	≤0.05%	≤0.05%	≤0.035%	≤0.035%	≤0.03%
	Phosphorus	≤0.035%	≤0.045%	≤0.045%	≤0.035%	≤0.035%	≤0.03%
	Aluminium	≥0.015%	≥0.015%	≥0.015%	≥0.015%	≥0.015%	≥0.015%
	Nitrogen	-	-	-	≤0.012%	≤0.015%	≤0.015%
	Titanium	-	-	-	-	≤0.05%	≤0.05%
	Vanadium	-	-	-	-	≤0.13%	≤0.13%
	Niobium	-	-	-	-	≤0.05%	≤0.05%
	Boron	-	-	-			≤0.004%
	Copper	-	-	-	≤0.40%	≤0.40%	≤0.40%
	Molybdenum	-	-	-	-	≤0.20%	≤0.20%

3. LCA Description and Rules

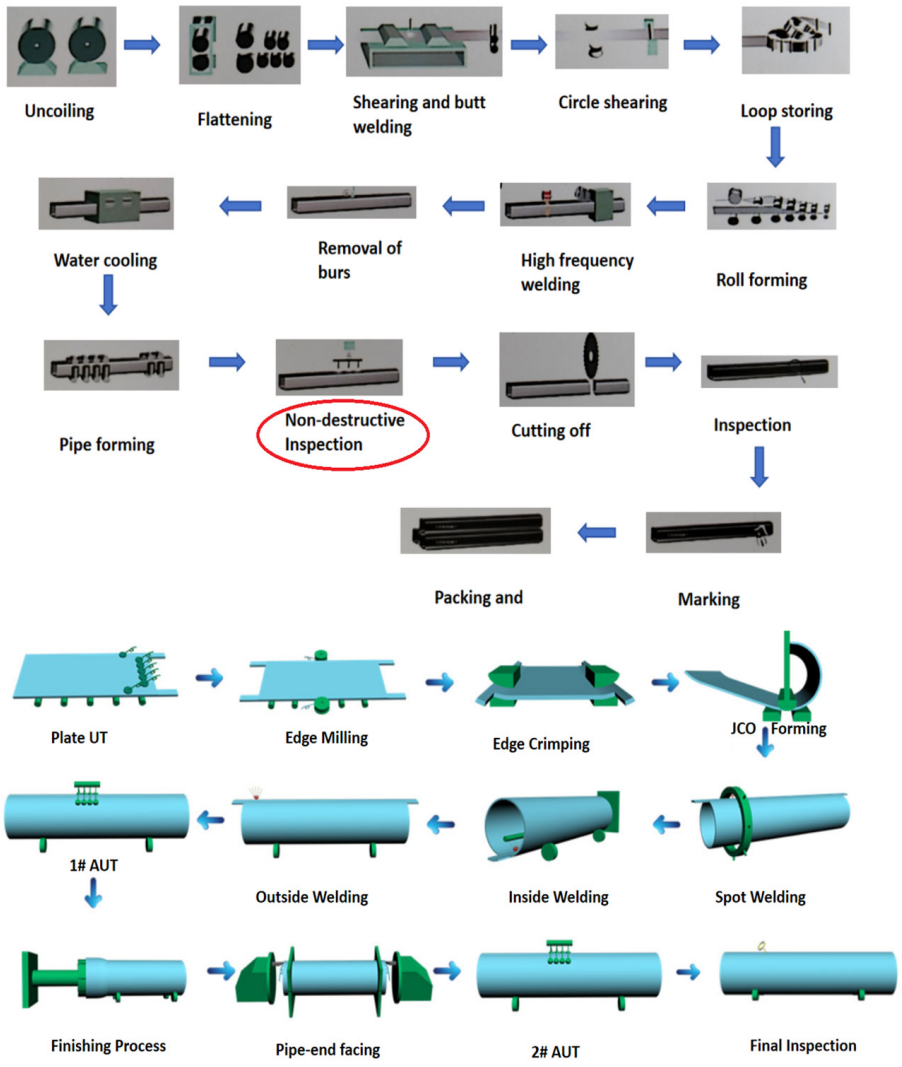
EPD Type	Average product EPD
System Boundary	See Figure 2: Modules Included
Declared Unit	1kg steel hollow section
Reference Service Life (RSL)	RSL is not applicable for this study, since product can be used for multiple applications with varying service life and no use phase declared.
Key Assumptions	Due to the unavailability of upstream production data, in this study, the differences between the "steel production, converter, unalloyed" and "steel production, converter, low-alloyed" datasets in the Ecoinvent database were compared. On the basis of the former, the differences in basic energy and materials in the latter were supplemented, and the input of metal materials was adjusted to the maximum value according to the proportions of each element in the standard. The input flows of the corresponding metal materials for each element almost all come from the input streams in "steel production, converter, low-alloyed".
Application of Cut-Off Criteria	According to PCR, the definition of cut-off criteria allows some data from the inventory to be disregarded when such data is considered irrelevant for the purposes of the study and would only represent an unnecessary burden in collecting data, without significantly altering the end result. Except for the exclusions listed in the PCR, no other specific cut-off criteria is applied. In this study, transport of waste and packaging and conventional production waste gas (A3) are cut off due to negligible effects. Meanwhile, according to the principle of "polluter pays", the packaging disposal process of raw materials falls under the responsibility of the upstream party.
Allocations	In this LCA study allocation is based on physical properties and is based on weight. For example, a variety of products are produced in one factory. The consumption of the target products is obtained by dividing the total annual production weight of each product by the total weight of all the products produced in the factory, obtaining the weight ratio of target product, and then multiplying by the total data. Co-product allocation: In this study, both the products and co-products are sold on the market and the difference in revenue per unit mass exceeds 25%. Economic allocation has been applied to allocate the environmental burdens across all input and output flows in this study. Main product's allocation ratio is 0.9888. Allocation for product and packing at end-of-life: under the Polluter Pays Principle (PPP), the product system carries the burden of disposal, the relevant benefit and the burden that may require corresponding subsequent post-treatment disposal processes are reflected in Module D.
Data Collection Period	January–December 2025
Primary Data Calculation and Averages	For production inputs and outputs at the factory level are first divided according to the corresponding production ratios of different product series to the target products, and then divided by the production volume of the target product (kg) to obtain the elementary flow.
Data Collection Period	Year 2024
Applied Software	openLCA 2.5.0

Applied Background Database	Ecoinvent 3 (cut-off, EN 15804)
Data Quality Assessment	Time representatives: The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 2 years old (typically 2025). Manufacturer-supplied data (primary data) are based on annualized production for 2025. The quality level of time representatives is very good. Geography representatives: The data used in the analysis provides the best possible representation available with current data. Electricity use for product manufacture is modelled using representative data for China North Grid. Surrogate data used in the assessment are representative of global or rest of world operations. Data representative of rest of world or global operations are considered sufficiently similar to actual processes. The quality level of geography representatives is very good or good. Technology representatives: For the most part, data is representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative fabrication datasets, specific to the type of material, are used to represent the actual processes, as appropriate. For the data with a major contribution, contributing together to at least 80 % of the absolute impact of any core environmental indicators included in the EPD, the quality level of technology representatives is good or fair. For the quantitative data quality assessment of each inventory, please refer to the LCA report.
LCIA Results Variability	0.95~1.05
Applied Energy Datasets	market for electricity, medium voltage (CN-NCGC). This dataset used to model grid electricity.
Applied Electricity Mix Carbon Footprint	1.0315 kg CO2e/kWh(Grid Electricity)

Figure 2: Modules Included

Information	Construction Works Life Cycle Information															Supplementary Information
Stages	Product			Construction Process		Use							End-of-Life				Benefits & Loads Beyond the System Boundary
Module Codes	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module Names	Raw Material Supply	Transport	Manufacturing	Transport	Construction Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water use	Deconstruction and Demolition	Transport	Waste Processing	Disposal	Reuse Recovery and Potential
Modules Declared	✓	✓	✓	ND	ND	ND	ND	ND	ND	ND	ND	ND	✓	✓	✓	✓	✓
Data	Based on Primary Information			Scenario													Scenario
	✓ = Module Included , ND = Module Not declared																

Figure 3: System Process Flow Chart



4. Scenarios and Additional Technical Information

The results have been calculated based on the below information.

Module	Scenario and Additional Technical Information
A1-A3	Due to the unavailability of upstream production data, in this study, the differences between the "steel production, converter, unalloyed" and "steel production, converter, low-alloyed" datasets in the Ecoinvent database were compared. On the basis of the former, the differences in basic energy and materials in the latter were supplemented, and the input of metal materials was adjusted to the maximum value according to the proportions of each element in the standard. The metal elements Manganese with an amount less than 1.8% was represented by “market for ferromanganese, high-coal, 74.5% Mn” from Ecoinvent database. The metal elements Silicon with an amount less than 0.55% was represented by “market for ferrosilicon” from Ecoinvent database. The metal elements Niobium with an amount less than 0.05% was represented by “market for ferroniobium, 66% Nb” from Ecoinvent database. The metal elements Vanadium with an amount less than 0.13% was represented and substituted with “vanadium-titanomagnetite mine operation and beneficiation: pig iron” from Ecoinvent database. The metal elements Titanium with an amount less than 0.05% was represented by “vanadium-titanomagnetite mine operation and beneficiation:titania slag, 94% titanium dioxide” from Ecoinvent database. The metal elements Chromium with an amount less than 0.3% was represented by “market for ferrochromium, high-carbon, 68% Cr” from Ecoinvent database. The metal elements Nickel with an amount less than 0.8% was represented by “market for nickel, class 1” from Ecoinvent database. The metal elements Copper with an amount less than 0.4% was represented by “market for copper, cathode” from Ecoinvent database. The metal elements Molybdenum with an amount less than 0.2% was represented by “market for molybdenite” from Ecoinvent database. The metal elements Boron with an amount less than 0.004% was represented and substituted with “market for sodium borates” from Ecoinvent database. Phosphorus and sulfur are non-metallic elements whose contents need to be controlled during the production process, and no additional considerations for their addition are made in the study. According to data from the National Bureau of Statistics of China, assuming a road lorry transportation distance of 183km within China.
C1	The treatment of 1 tonne of steel waste is assumed to require 1.1 kWh of diesel, with an energy conversion factor of 1 kWh = 3.6 MJ. Corresponding to 1kg of steel waste, 0.00396MJ is required.
C2	It is assumed that all dismantled steel waste is transported to a waste processing facility and none is incinerated. A 50% loading rate is assumed for transport, with a transport distance of 80 km. In addition, the transportation of packaging waste is also considered in this stage based on the same transportation distance.

C3	Based on data from the World Steel Association, 85% of the steel waste is assumed to be recovered as secondary material. The recovered steel is loaded and unloaded onto sorting equipment, followed by mechanical sorting and fragging. Diesel consumption for loading and unloading is 1.8 kWh/tonne, diesel for fragging operations is 7.4 kWh/tonne, with an energy conversion factor of 1 kWh = 3.6 MJ. Corresponding to 1kg of steel waste, 0.03312MJ is required.
C4	It is assumed that 15% of the steel waste is landfilled. Diesel consumption for landfilling activities is 1.6 kWh/tonne, with an energy conversion factor of 1 kWh = 3.6 MJ. In addition, the disposal of packaging waste is also considered at this stage, based on the "treatment of waste steel, inert material landfill" and "treatment of waste polyvinylchloride, sanitary landfill" in the Ecoinvent database.
D	Steel is fully recyclable, and an 85% recovery rate—based on World Steel data—is applied to calculate the end-of-life (EoL) recycling credit. This credit reflects both the burdens associated with recycling processes and the environmental benefits arising from the substitution of primary (virgin) steel production. Declared benefits and loads associated with the net flow of secondary material are included in Module D, while co-product allocation is excluded in this stage in accordance with PCR requirements. Metals are assumed to reach the end-of-waste state after sorting and shredding processes. Module D therefore captures the treatment of recovered scrap, the net benefits associated with its recycling potential, and the avoided impacts resulting from the replacement of virgin steel production. Following is the formula used to calculate Module D, along with the corresponding parameter values applied in this study: $$e_{module\ D1} = \sum_i \left(M_{MR\ out}\big|_i - M_{MR\ in}\big|_i\right) \cdot \left(E_{MR\ after\ EoW\ out}\big|_i - E_{VMSub\ out}\big|_i \cdot \frac{Q_{R\ out}}{Q_{Sub}}\Big|_i\right)$$ $M_{MR\ in}$=0; $M_{MR\ out}$= It is assumed that 85% of the steel waste becomes secondary material, with the value taken from Module C3.; $M_{MR\ after\ EoW\ out}$ use ecoinvent database “steel production, electric, low-alloyed” for modelling ; $E_{VMSub\ out}$ use ecoinvent database “steel production, converter, unalloyed” for modelling; the quality ratio $Q_{R\ out}$ / Q_{Sub} in accordance with the PCR, the ratio is assumed to be 1.

5. LCA Results – Definitions and Disclaimers

All results have been calculated and displayed as per EN15804. Units Methods and abbreviations are defined below. Results are reported in scientific notation.

Table 6: Core Indicators

Impact Category	Indicator	Acronym	Unit
Climate change – total	Global Warming Potential total	GWP-total	kg CO2 eq.
Climate change - fossil	Global Warming Potential fossil fuels	GWP-fossil	kg CO_2 eq.
Climate change - biogenic	Global Warming Potential biogenic	GWP-biogenic	kg CO_2 eq.
Climate change - land use and land use change	Global Warming Potential land use and land use change	GWP-luluc	kg CO_2 eq.
Ozone Depletion	Depletion potential of the stratospheric ozone layer	ODP	kg CFC 11
Acidification	Acidification potential, Accumulated Exceedance	AP	eq.
Eutrophication aquatic freshwater	Eutrophication potential, fraction of nutrients reaching freshwater end compartment	EP-freshwater	mol H^+ eq.
Eutrophication aquatic marine	Eutrophication potential, fraction of nutrients reaching freshwater end compartment	EP-marine	kg P eq.
Eutrophication terrestrial	Eutrophication potential, Accumulated Exceedance	EP-terrestrial	kg N eq.
Photochemical ozone formation	Formation potential of tropospheric ozone	POCP	kg NMVOC eq.
Depletion of abiotic resources – minerals and metals[2]	Abiotic depletion potential for non-fossil resources	ADP-minerals&metals	kg Sb eq.
Depletion of abiotic resources - fossil fuels[2]	Abiotic depletion potential for fossil resources	ADP-fossil	MJ, net calorific value
Water use[2]	Water (user) deprivation potential, deprivation-weighted water consumption	WDP	m^3 world eq. deprived

Disclaimer 2 – 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.

Table 7: Additional Indicators

Impact category	Indicator	Acronym	Unit
Particulate matter emissions	Potential incidence of disease due to PM emissions	PM	Disease incidence
Ionising radiation, human health[1]	Potential Human exposure efficiency relative to U235	IRP	kBq U235 eq.
Ecotoxicity (freshwater)[2]	Potential Comparative Toxic Unit for ecosystems	ETP-fw	CTUe
Human toxicity, cancer effects[2]	Potential Comparative Toxic Unit for humans	HTP-c	CTUh
Human toxicity, non- cancer effects[2]	Potential Comparative Toxic Unit for humans	HTP-nc	CTUh
Land use related impacts / soil quality[2]	Potential Soil quality index	SQP	dimensionless
Disclaimer 1 – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.			
Disclaimer 2 – 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.			

Table 8: Resource Use, Waste and Output Flow Parameters

Parameter	Acronym	Unit
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ, net calorific value
Use of renewable primary energy resources used as raw materials	PERM	MJ, net calorific value
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ, net calorific value
Use of non-renewable primary energy excluding non- renewable primary energy resources used as raw materials	PENRE	MJ, net calorific value
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ, net calorific value
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ, net calorific value
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ, net calorific value
Use of non-renewable secondary fuels	NRSF	MJ, net calorific value

Net use of fresh water	FW	m^3
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg
Components for re-use	CRU	kg
Materials for recycling	MFR	kg
Materials for energy recovery	MER	kg
Exported energy	EE	MJ per energy carrier

6. LCA Results

For more information about indicators see Section 5 Definitions and Disclaimers

Table 9: Core Indicator Results for 1kg Low carbon steel hollow section, mild steel hollow section, low alloy steel hollow section(1kg)

		Raw Material Supply						Transport	Manufacturing	Deconstruction and Demolition	Transport	Waste Processing	Disposal	Reuse Recovery and Potential
Indicator Acronym	**Unit**	**A1(Q195)**	**A1(Q235)**	**A1(Q275)**	**A1(Q335)**	**A1(Q420)**	**A1(Q460)**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-total	kg CO2 eq.	1.92E+00	1.95E+00	1.95E+00	2.07E+00	2.17E+00	2.18E+00	3.01E-02	1.64E-03	3.99E-04	1.62E-02	3.33E-03	9.16E-05	-7.17E-01
GWP-luluc	kg CO2 eq.	8.09E-04	8.33E-04	8.35E-04	1.07E-03	1.44E-03	1.44E-03	1.37E-05	1.09E-06	4.03E-08	7.12E-06	3.37E-07	1.15E-08	2.02E-03
GWP-biogenic	kg CO2 eq.	-7.11E-03	-7.03E-03	-7.02E-03	-6.62E-03	-5.87E-03	-5.85E-03	8.25E-06	8.09E-06	6.45E-08	3.62E-06	5.40E-07	1.99E-08	5.25E-03
GWP-fossil	kg CO2 eq.	1.92E+00	1.96E+00	1.96E+00	2.07E+00	2.18E+00	2.18E+00	3.01E-02	1.63E-03	3.98E-04	1.62E-02	3.33E-03	9.15E-05	3.05E+00
ADP-fossil2	MJ, net calorific value	1.90E+01	1.94E+01	1.94E+01	2.09E+01	2.24E+01	2.24E+01	4.22E-01	1.77E-02	5.17E-03	2.23E-01	4.32E-02	1.24E-03	3.18E+01
ADP-minerals & metals[2]	kg Sb eq.	1.63E-06	1.75E-06	1.76E-06	3.73E-05	8.70E-05	8.72E-05	9.98E-08	1.10E-08	1.45E-10	5.48E-08	1.21E-09	3.88E-11	1.96E-05
EP-freshwater	kg P eq.	6.96E-04	7.11E-04	7.12E-04	9.47E-04	1.18E-03	1.18E-03	3.33E-06	1.03E-06	1.28E-08	1.77E-06	1.07E-07	3.48E-10	1.60E-03
POCP	kg NMVOC eq.	5.83E-03	6.01E-03	6.03E-03	7.17E-03	8.45E-03	8.47E-03	1.94E-04	5.62E-06	5.47E-06	7.62E-05	4.58E-05	1.23E-06	9.84E-03

AP	mol H+ eq.	6.61E-03	6.85E-03	6.87E-03	1.37E-02	2.13E-02	2.14E-02	1.38E-04	6.56E-06	3.56E-06	5.51E-05	2.98E-05	8.09E-07	1.24E-02
EP-terrestrial	mol N eq	1.75E-02	1.81E-02	1.82E-02	2.10E-02	2.40E-02	2.41E-02	5.61E-04	1.61E-05	1.82E-05	1.94E-04	1.53E-04	4.09E-06	2.94E-02
EP-marine	kg N eq.	1.62E-03	1.68E-03	1.69E-03	1.93E-03	2.18E-03	2.18E-03	5.17E-05	1.82E-06	1.67E-06	1.79E-05	1.39E-05	3.73E-07	2.99E-03
ODP	kg CFC 11 eq.	8.14E-09	8.28E-09	8.29E-09	9.58E-09	1.12E-08	1.12E-08	4.30E-10	1.05E-11	6.13E-12	2.21E-10	5.13E-11	1.42E-12	1.61E-08
WDP	m3 world eq. deprived	5.31E-01	5.37E-01	5.38E-01	7.85E-01	1.16E+00	1.16E+00	2.32E-03	7.79E-04	1.30E-05	1.17E-03	1.08E-04	7.78E-06	1.23E+00
Disclaimer 2 – 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.														

Table 10: Additional Indicator Results for 1kg Low carbon steel hollow section, mild steel hollow section, low alloy steel hollow section(1kg)

		Raw Material Supply						Transport	Manufacturing	Deconstruction and Demolition	Transport	Waste Processing	Disposal	Reuse Recovery and Potential
Indicator Acronym	**Unit**	**A1(Q195)**	**A1(Q235)**	**A1(Q275)**	**A1(Q335)**	**A1(Q420)**	**A1(Q460)**	**A2**	**A3**	**C1**	**C2**	**C3**	**C4**	**D**
ETP-fw	CTUe	6.43E+00	6.65E+00	6.68E+00	1.03E+01	1.40E+01	1.40E+01	9.54E-02	1.90E-02	5.24E-04	5.12E-02	4.39E-03	1.26E-04	2.42E+01
HTP-c	CTUh	2.19E-09	2.20E-09	2.20E-09	2.60E-09	2.80E-09	2.80E-09	7.04E-12	1.70E-12	3.82E-14	2.61E-12	3.20E-13	9.69E-15	3.18E-09
HTP-nc	CTUh	7.63E-09	7.86E-09	7.88E-09	3.27E-08	3.75E-08	3.75E-08	2.82E-10	2.99E-11	6.79E-13	1.35E-10	5.68E-12	1.59E-13	9.44E-08
SQP	Dimensionless	4.89E+00	5.06E+00	5.07E+00	6.28E+00	7.76E+00	7.78E+00	3.13E-01	5.40E-03	3.57E-04	1.32E-01	2.98E-03	2.93E-04	9.65E+00
PM	Disease incidence	2.07E-07	2.13E-07	2.14E-07	2.44E-07	2.60E-07	2.61E-07	2.83E-09	1.57E-10	1.02E-10	1.25E-09	8.51E-10	2.29E-11	3.15E-07

IRP	kBq U235 eq	2.92E-02	3.08E-02	3.09E-02	4.68E-02	6.64E-02	6.65E-02	3.47E-04	5.66E-05	2.16E-06	1.75E-04	1.81E-05	2.14E-07	8.97E-02
Disclaimer 1 – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.													
Disclaimer 2 – 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.													

Table 11: Resource Use, Waste and Output Flow for 1kg Low carbon steel hollow section, mild steel hollow section, low alloy steel hollow section(1kg)

		Raw Material Supply						Transport	Manufacturing	Deconstruction and Demolition	Transport	Waste Processing	Disposal	Reuse Recovery and Potential
Resource Acronym	Unit	A1 (Q195)	A1 (Q235)	A1 (Q275)	A1 (Q335)	A1 (Q420)	A1 (Q460)	A2	A3	C1	C2	C3	C4	D
PENRE	MJ, NCV	1.90E+01	1.93E+01	1.93E+01	2.08E+01	2.23E+01	2.24E+01	4.22E-01	1.77E-02	5.17E-03	2.23E-01	4.32E-02	6.49E-03	3.18E+01
PERE	MJ, NCV	7.25E-01	8.02E-01	8.10E-01	1.60E+00	2.73E+00	2.74E+00	6.08E-03	1.70E-03	3.23E-05	3.11E-03	2.70E-04	4.10E-05	3.05E+00
PENRM	MJ, NCV	2.90E-02	5.07E-02	5.30E-02	6.75E-02	6.97E-02	7.20E-02	0.00E+00	1.42E-05	0.00E+00	0.00E+00	0.00E+00	1.43E-05	0.00E+00
PERM	MJ, NCV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ, NCV	1.91E+01	1.94E+01	1.94E+01	2.09E+01	2.24E+01	2.24E+01	4.22E-01	1.77E-02	5.17E-03	2.23E-01	4.32E-02	6.50E-03	3.18E+01
PERT	MJ, NCV	7.25E-01	8.02E-01	8.10E-01	1.60E+00	2.73E+00	2.74E+00	6.08E-03	1.70E-03	3.23E-05	3.11E-03	2.70E-04	4.10E-05	3.05E+00

FW	**m3**	1.07E-02	1.09E-02	1.09E-02	1.64E-02	2.49E-02	2.49E-02	5.77E-05	-2.29E-05	3.11E-07	2.89E-05	2.60E-06	4.96E-07	-2.43E-03
SM	**kg**	2.40E-01	2.41E-01	2.41E-01	2.42E-01	2.43E-01	2.43E-01	1.85E-04	2.69E-04	2.14E-06	9.84E-05	1.79E-05	2.68E-06	8.74E-01
RSF	**MJ, NCV**	7.66E-05	8.11E-05	8.16E-05	9.76E-05	1.14E-04	1.14E-04	2.40E-06	1.69E-07	5.62E-09	1.28E-06	4.70E-08	7.53E-09	3.32E-04
NRSF	**MJ, NCV**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HWD	**kg**	5.44E-01	5.91E-01	5.96E-01	1.57E+00	2.58E+00	2.58E+00	2.87E-03	1.94E-03	1.68E-05	1.55E-03	1.40E-04	2.11E-05	3.38E+00
NHWD	**kg**	4.16E+00	4.32E+00	4.34E+00	5.83E+00	7.85E+00	7.87E+00	4.41E-02	2.11E-02	8.36E-05	2.03E-02	6.99E-04	1.51E-01	2.05E+01
RWD	**kg**	7.04E-06	7.43E-06	7.47E-06	1.21E-05	1.80E-05	1.80E-05	8.31E-08	1.41E-08	5.08E-10	4.19E-08	4.25E-09	6.43E-10	2.21E-05
CRU	**kg**	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	**kg**	2.28E-03	2.32E-03	2.33E-03	2.57E-03	2.77E-03	2.77E-03	1.15E-05	1.96E-06	9.01E-08	5.97E-06	7.53E-07	8.50E-01	3.43E-03
MER	**kg**	9.02E-07	9.24E-07	9.26E-07	1.39E-06	1.91E-06	1.91E-06	2.64E-08	5.94E-09	6.97E-11	1.45E-08	5.83E-10	8.82E-11	1.01E-05
EEE	**MJ, NCV**	2.82E-03	3.04E-03	3.06E-03	3.50E-03	3.75E-03	3.77E-03	3.79E-05	5.93E-06	2.45E-07	1.90E-05	2.05E-06	3.09E-07	6.59E-03
ETE	**MJ, NCV**	1.69E-03	1.75E-03	1.75E-03	2.46E-03	3.14E-03	3.15E-03	5.13E-05	8.09E-06	1.15E-07	3.34E-05	9.60E-07	1.46E-07	1.42E-02
Note 1 –NCV=net calorific value														
Note 2 –EEE plus ETE=EE														

7. Interpretation

Key findings: The stage contribution analysis and process contribution analysis reveal that the environmental impact of low carbon steel hollow section, mild steel hollow section, low alloy steel hollow section product is dominated by the upstream supply chain of the raw material in all declared indicators.

Sensitivity analysis: the analysis shows that the changes in assumptions such as change allocation method can lead to certain fluctuation of the final LCA results, hence it is recommended to continuously update the model to get up-to-date results, in case the assumption or process parameters would be changed in the future, or better data would be provided.

The LCA study has been carried out based on available data, information, regional and global knowledge, and experience to achieve the best possible accuracy, completeness, and representative of the results.

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