

Environmental Product Declaration

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

Powder Epoxy Coated ERW Steel Pipes

EAF Routed Steel

from

Tosçelik



PROGRAMME

The International EPD® System, www.environdec.com
EPD Turkey, www.epdturkey.org

PROGRAMME OPERATOR

EPD International AB & EPD Turkey

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Programme Information

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 verification of the declaration and data, according to ISO 14025:2006:

☐ EPD process verification ☒ EPD verification

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☐ Yes ☒ No

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Company Information

Owner of the EPD

Tosçelik Profil ve Sac End. A.Ş.
Organize Sanayi Bölgesi PK 80950
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Tosçelik Profil ve Sac Endüstrisi A.Ş., which operates under Tosyalı Holding, was established in 1997 in Iskenderun Industrial Zone for industrial pipe and box profile production.

Ranked in the ISO 500 list for the first time in 2000, Tosçelik established Turkey's most modern spiral pipe plant with the largest capacity in Osmaniye Industrial Zone in 2008. The plant started production at the beginning of 2009.

Continuing its investments without slowing down, the company produced the first special hot rolled flat product in 2009 at Tosçelik Osmaniye Structural Steel Production Plant, which had been constructed in 18 months. This investment stands out as the first flat steel production facility constructed from scratch by the private sector of the Republic of Turkey.

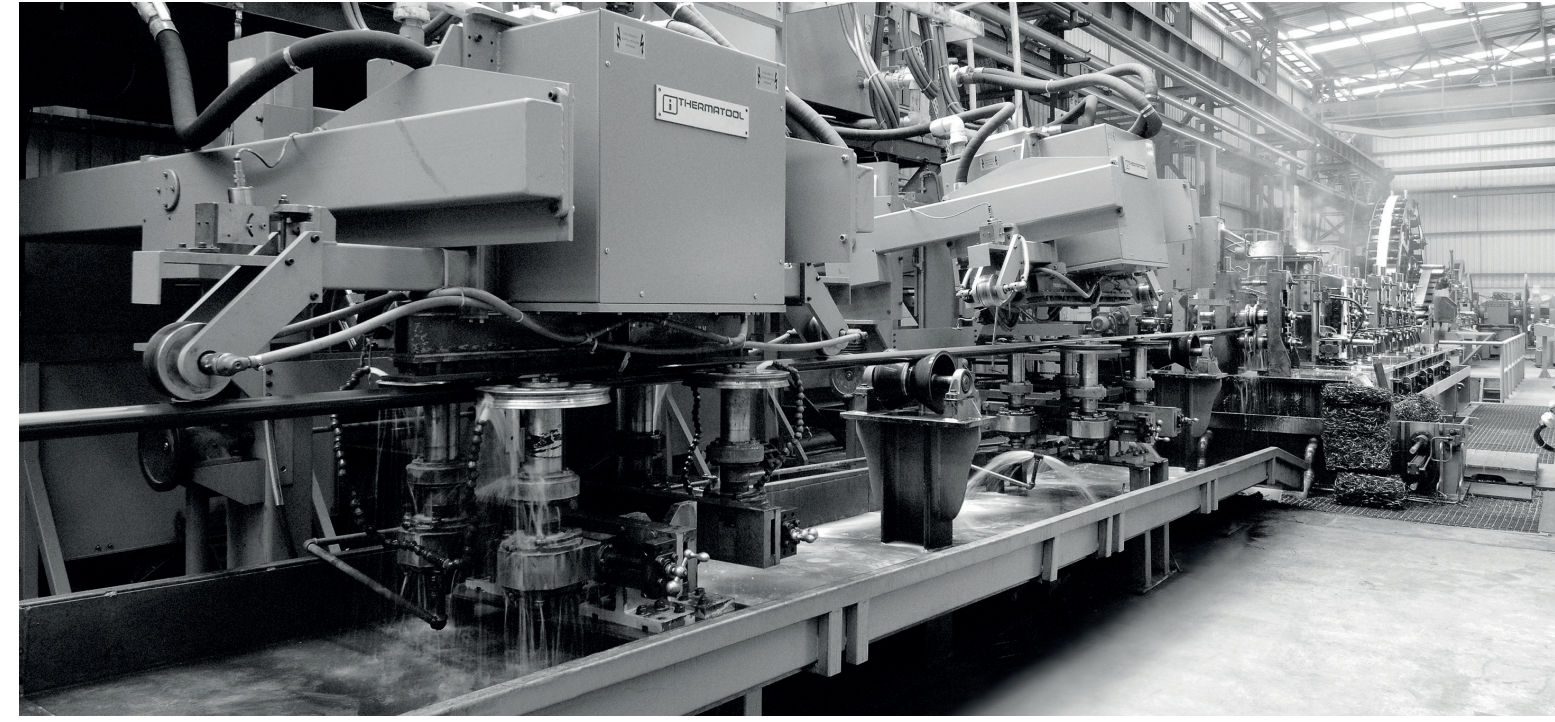


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In 2011, the Company ranked 25th in the ISO 500 list with its exports made under the Tosçelik brand. With its investments made with the motto 'Turkey's global steelmaker' and export volume increasing every year, the Company continues to rank among the top 20 companies in every edition of ISO-500 list, climbing up steadily.

In 2012 the pipe and profile plant started production in Osmaniye Organized Industrial Zone. The plant is Turkey's largest and Europe's second largest manufacturer of ERW pipes and has the largest indoor space under a single roof, in Europe.

In 2013, the plant joined the Turquality Brand Incentive Program, the first and only branding program in the world, under the brand of Tosçelik. The company is in its second 5th year under the



Turquality program and maintains efforts to keep Tosçelik among the world's leading brands.

In 2014, Tosçelik became one of the main suppliers for the Trans-Anatolian Natural Gas Pipeline Project (TANAP), one of the world's leading projects. In the TANAP Project, Tosçelik supplied approximately 470 km of the 1850 km long line, which is approximately one third of the total need.

ERW pipe and profile plant was commissioned in 2016 in Dilovası / Gebze.

In 2016, Tosçelik ranked 90th out of the top 1000 companies among 61,000 exporters and was awarded 'the Company with the Largest Export Breakthrough' at the TIM's (Exporters Council of Turkey) 'Export Champions' ceremony.

Tosçelik opened its R & D Center in Osmaniye in 2017, making a difference in the sector since the very first day it was founded with an aim to produce strongly innovative, value-added products. As the first in its region, the R & D Center is also the home base of the research and development activities in all production facilities of the Group.

With awareness of its responsibilities in terms of sustainability and energy efficiency, Tosçelik established a solar power plant in 2017 on the roof of the Tosçelik pipe and profile facility in Osmaniye Organized Region. Through this investment, it has

the potential to become the ERW pipe manufacturer with world's lowest carbon footprint. With a rooftop area spanning 200,000 m², the plant has become one of the top five roof-type solar power plants in Europe and the largest in the world.

Exporting products to 135 countries, Tosçelik continues its activities that shape the industry, and its local and international investments that will contribute to the country, people and nature.

Production Site

Tosçelik Osmaniye ERW
Büyüktüysüz Mah. Ali İlbeyli Cad. No:18 Tüysüz
Beldesi Toprakkale / Osmaniye

Product Information

Product Name:
**Powder Epoxy Coated
ERW Steel Pipes**

Area of Use
It is used in application areas such as drinking and utility water, natural gas and petroleum-derived, aviation fuel and transmission of chemical fluids to increase corrosion resistance.

- Coating Methods**
External Coating
- 3-layer Polyethylene coating,
 - 3-layer Polypropylene coating
 - Powder Epoxy Coating.

- Internal Coating**
- Flow Coat Liquid Epoxy with Solvant

Note: Standard PE coating colors are Yellow and Black. Other colors can be applied when demanded.



Productions Range
Outside Diameter: 21.3 – 339.7 mm (½” – 13 3/8”)
Wall Thickness: 2.6 mm – 13.0 mm
Length: 6 m – 14 m

Coating Standards
Polyethylene Coating: DIN 30670
Polypropylene Coating: DIN 30678, ISO 21809
Epoxy Coating: AWWA C210, API RP 5L2

Technical Specifications

Production Standards	Steel Quality
EN 10219	S235JRH, S275J0H, S275J2H, S355J0H, S355J2H, S355K2H, S275NH, S275NLH, S355NH, S355NLH, S460NH, S460NLH, S275MH, S275MLH, S355MH, S355MLH, S420MH, S420MLH, S460MH, S460MLH
SI 1458-1	S235JRH, S275J0H, S275J2H, S355J0H, S355J2H, S355K2H, S275NH, S275NLH, S355NH, S355NLH, S460NH, S460NLH, S275MH, S275MLH, S355MH, S355MLH, S420MH, S420MLH, S460MH, S460MLH
EN 10305-3	E155, E190, E195, E220, E235, E260, E275, E320, E355, E370, E420
ASTM A500	Grade A, Grade B, Grade C, Grade D
EN 10217-1	P195TR1, P235TR1, P265TR1, P195TR2, P235TR2, P265TR2
EN 10255	S195T
ASTM A53	Grade A, Grade B
ASTM A795	Grade A, Grade B
EN 10224	L235, L275, L355
API 5L PSL 1	A25 (L175), A (L210), B (L245), X42 (L290), X46 (L320), X52 (L360), X56 (L390), X60 (L415), X65 (L450)
API 5L PSL 2	BM (L245M), BN (L245N), X42M (L290M), X42N (L290N), X46M (L320M), X46N (L320N), X52M (L360M), X52N (L360N), X56M (L390M), X56N (L390N), X60M (L415M), X60N (L415N), X65M (L450M)
ISO 3183 PSL 1	A25 (L175), A (L210), B (L245), X42 (L290), X46 (L320), X52 (L360), X56 (L390), X60 (L415), X65 (L450)
ISO 3183 PSL 2	BM (L245M)/BN (L245N), X42M (L290M)/X42N (L 245N), X46M (L320M)/X46N (L 320N), X52M (L360M)/X52N (L 320N), X56M (L390M)/X56N (L 390N),X60M (L415M)/X60N (L 415N), X65M (L450M)
EN 10210	S235JRH, S275J0H, S275J2H, S355J0H, S355J2H, S355K2H, S275NH, S275NLH, S355NH, S355NLH, S420NH, S420NLH
EN 10217-2	P195GH, P235GH, P265GH, 16Mo3
SI 4314	Grade A, Grade B
SI 103	S 414, S 332
SI 530	530A, 530B, 530/42
AS/NZS 1163	C250, C350, C450, C250L0, C350L0

UN CPC Code 41534 Plates, sheets and strip, of steel, of a thickness exceeding 0.2 mm

LCA Information

Declared unit
1 tonne (1000kg) of fabricated steel product manufactured in Osmaniye and Dilovası facilities (TR).

Reference service life
Not applicable

Time representativeness
The production data in this LCA study represents the period of 1st January 2020 and 31st December 2020.

Database(s) and LCA software used
SimaPro v9.1 and Ecoinvent v3.6.

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 Tosçelik Profil ve Sac Endüstri Osmaniye plant. 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 v3.6.

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

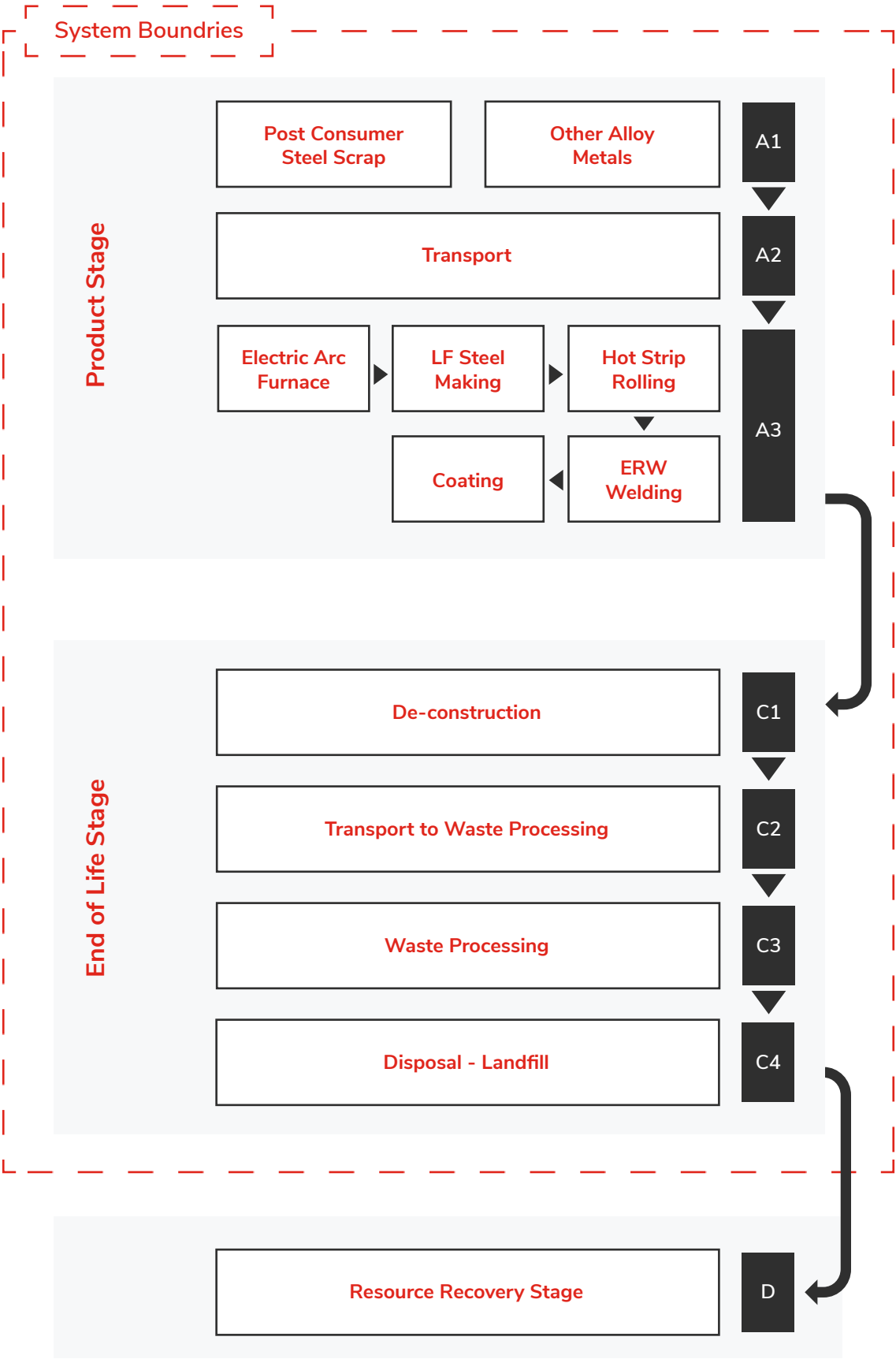
Cut-off rules
Life Cycle Inventory data for a minimum of 99% of total inflows to the three life cycle stages have been included and a cut-off rule of 1% regarding energy, mass and environmental relevance was applied. Impacts caused by treatment operations have been calculated lower than 1% environmental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

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

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				RESOURCE RECOVERY STAGE
	Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operaitonal energy use	Operational water use	De-construction	Transport	Waste processing	Disposal	Reuse - Recovery - Recycling Potential
MODULES	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	TR	TR	TR	-	-	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Specific data used	>99.5%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-products	Not Relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation-sites	Not Relevant			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X: Declared; ND: Not Declared

System Diagram



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 seaway, 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
- Spiral Welding
- 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 C2 Module	
Transport by road*	Lorry >32 metric ton
Distance (km)	100
Database	Ecoinvent v3.6

*Technology is Euro 5

parameters described in the table below.
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



Content Declaration

Content declaration of 1000kg of iron roll	
Material	Share
Scrap iron	99.0-99.9%
Alliage	0.1-1%
Renewable material	0%
Biogenic carbon	0%

Environmental Performance

Potential Environmental Impact Mandatory Indicators According to EN 15804

Results for 1000 kg of ERW Pipe							
Indicator	Unit	A1:A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq	748	1.43	9.27	0	0.260	-13.6
GWP-biogenic	kg CO ₂ eq	3.75	0.014	0.005	0	0.001	-0.222
GWP-luluc	kg CO ₂ eq	3.72	0.002	0.003	0	7.25E-05	-0.043
GWP-total	kg CO ₂ eq	755	1.4507	9.28	0	0.261	-13.88
ODP	kg CFC 11eq	3.69E-05	9.61E-08	2.10E-06	0	1.07E-07	-1.26E-06
AP	mol H+ eq	4.30	0.007	0.04	0	0.002	-0.101
EP-Freshwater	kg PO43- eq	0.405	0.001	0.005	0	3.29E-04	-0.012
	kg P eq	0.046	1.05E-04	8.27E-05	0	2.92E-06	-0.001
EP-Marine	kg N eq	0.748	0.001	0.012	0	8.50E-04	-0.025
EP-Terrestrial	kg N eq	8.39	0.015	0.129	0	0.009	-0.280
POCP	kg NMVOC eq	2.32	5.70E-03	0.041	0	0.003	-0.096
ADP-minerals &metals*	kg Sb eq	0.002	1.89E-05	1.56E-04	0	2.38E-06	-1.06E-04
ADP-fossil*	MJ	7219	20.3	142	0	7.28	-243
WDP	m³	186	0.91	0.516	0	0.326	-5.11

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-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.

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	745	1.39	9.19	0	0.256	-13.388
Results according to EN 15804+A2 for 1000 kg of ERW Pipe							
PM	[disease inc.]	2.76E-05	4.07E-07	8.22E-07	0	4.79E-08	-1.24E-05
IRP	[kBq U235 eq]	8.32	0.107	0.597	0	0.030	-1.45
ET-freshwater	[CTUe]	6035	47.7	121.396	0	4.720	-559.263
HT-cancer	[CTUh]	7.13E-07	3.06E-08	2.80E-09	0	1.09E-10	-5.15E-07
HT-non-cancer	[CTUh]	4.62E-06	1.02E-07	1.30E-07	0	3.37E-09	-1.88E-07
SQP	[pt]	749	5.58	160	0	15	-103

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 for 1000 kg of ERW Pipe							
Indicator	Unit	A1:A3	C1	C2	C3	C4	D
PERE	MJ	1103	3	1.523	0	0.059	-58.66
PERM	MJ	0	0	0	0	0	0
PERT	MJ	1103	3	1.523	0	0.059	-58.665
PENRE	MJ	7877	21	150.5	0	7.728	-257.0
PENRM	MJ	0.00	0	0	0	0	0
PENRT	MJ	7877	21	150.5	0	7.728	-257.0
SM	kg	1051	0	0	0	0	0
RSF	MJ	0.00	0	0	0	0	0
NRSF	MJ	0.00	0	0	0	0	0
FW	m³	28.45	0.162	0.123	0	0.012	-1.44

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 re-sources;
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 for 1000 kg of ERW Pipe							
Indicator	Unit	A1:A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	15.5	0	0	0	0	0
Non-hazardous waste disposed	kg	1.77	0	0	0	50	0
Radioactive waste disposed	kg	0	0	0	0	0	0

Output Flows

Results for 1000 kg of ERW Pipe							
Indicator	Unit	A1:A3	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	0	0	0
Materials for recycling	kg	141	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 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
- **ISO 14020** 2000 Environmental labels and declarations - General principles
- **EN 15804:2012+A2:2019** Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- **The International EPD® System** www.environdec.com
- **The International EPD® System** The General Programme Instructions v3.01
- **The International EPD® System** PCR 2029:14 Construction products v1.1 (EN 15804:A2)
- **Ecoinvent 3.6** www.ecoinvent.org
- **SimaPro LCA Software** www.simapro.com
- **Toscelik Profil ve Sac** www.toscelik.com.tr

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