

Environmental Product Declaration

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

Three Layer Polyethylene (PE) Coated ERW Steel Pipe

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

EPD REGISTRATION NUMBER

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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

Third party verifier

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Approved by

The International EPD® System Technical Committee, supported by the Secretariat

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

Yes

No

LCA Study & EPD Design Conducted by

Semtrio Sustainability Consulting

BUDOTEK Teknopark, No 4/21

Umraniye / Istanbul Turkey

www.semtrio.com



Tosçelik Profil ve Sac End. A.Ş. 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

Tosçelik Profil ve Sac End. A.Ş.
Organize Sanayi Bölgesi PK 80950
Toprakkale-Osmaniye/Turkey
www.toscelik.com.tr

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.

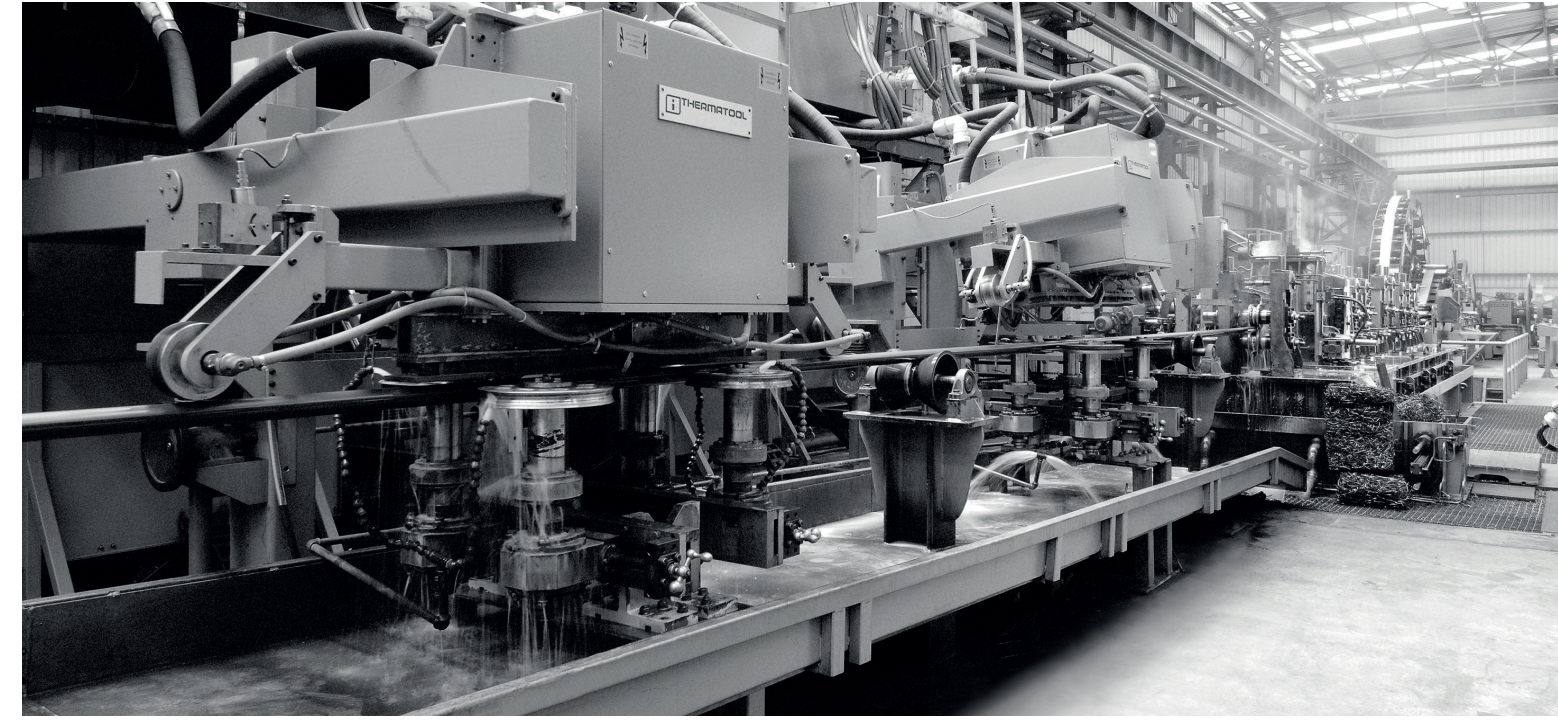


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In 2011, the Company ranked 25th in the ISO 500 list with its exports made under the Tosçelik brand. With its investments made with the motto 'Turkey's global steelmaker' and export volume increasing every year, the Company continues to rank among 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:

Three Layer Polyethylene (PE)

Coated ERW Steel Pipe

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

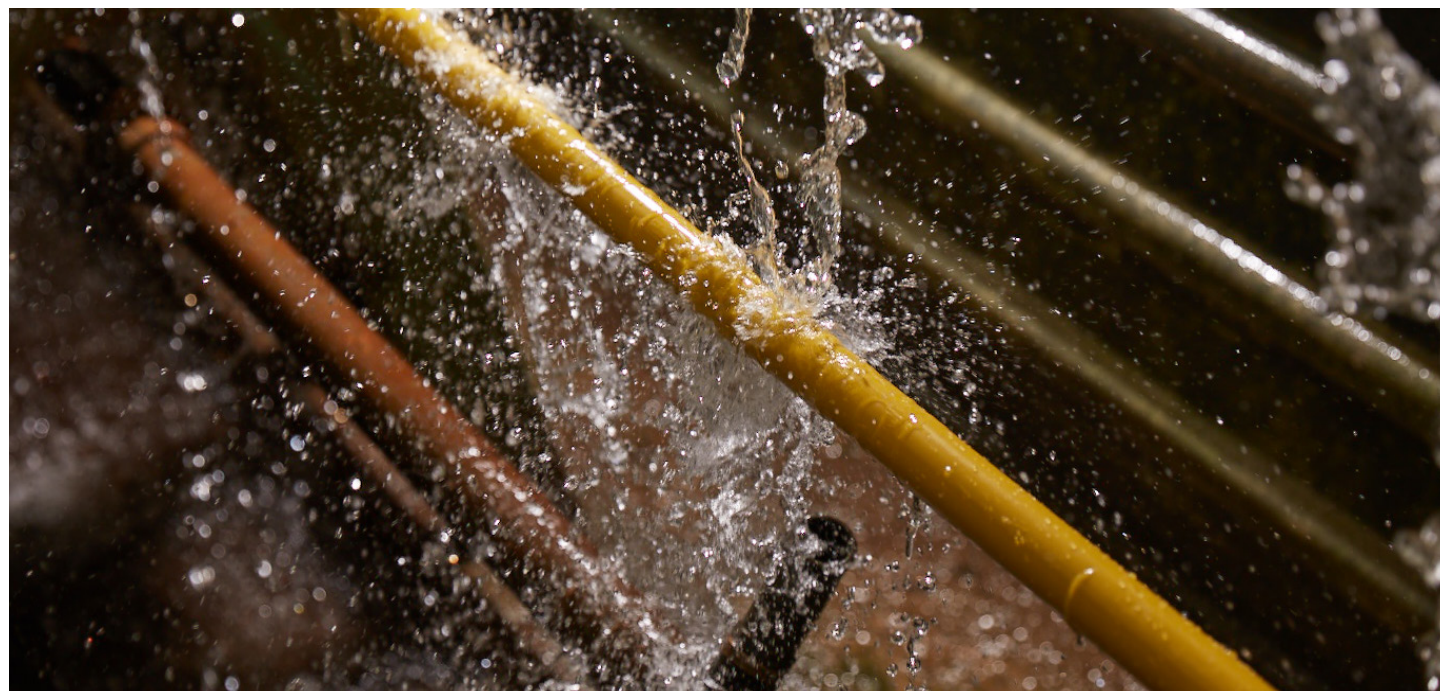
Length: 6 m – 14 m

Coating Standards

Polyethylene Coating: DIN 30670

Polypropylene Coating: DIN 30678, ISO 21809

Epoxy Coating: AWWA C210, API RP 5L2



Technical Specifications

| Production Standards | Steel Grades |
|----------------------|--|
| 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 (L290N), X46M (L320M)/X46N (L320N), X52M (L360M)/X52N (L360N), X56M (L390M)/X56N (L390N), X60M (L415M)/X60N (L415N), 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

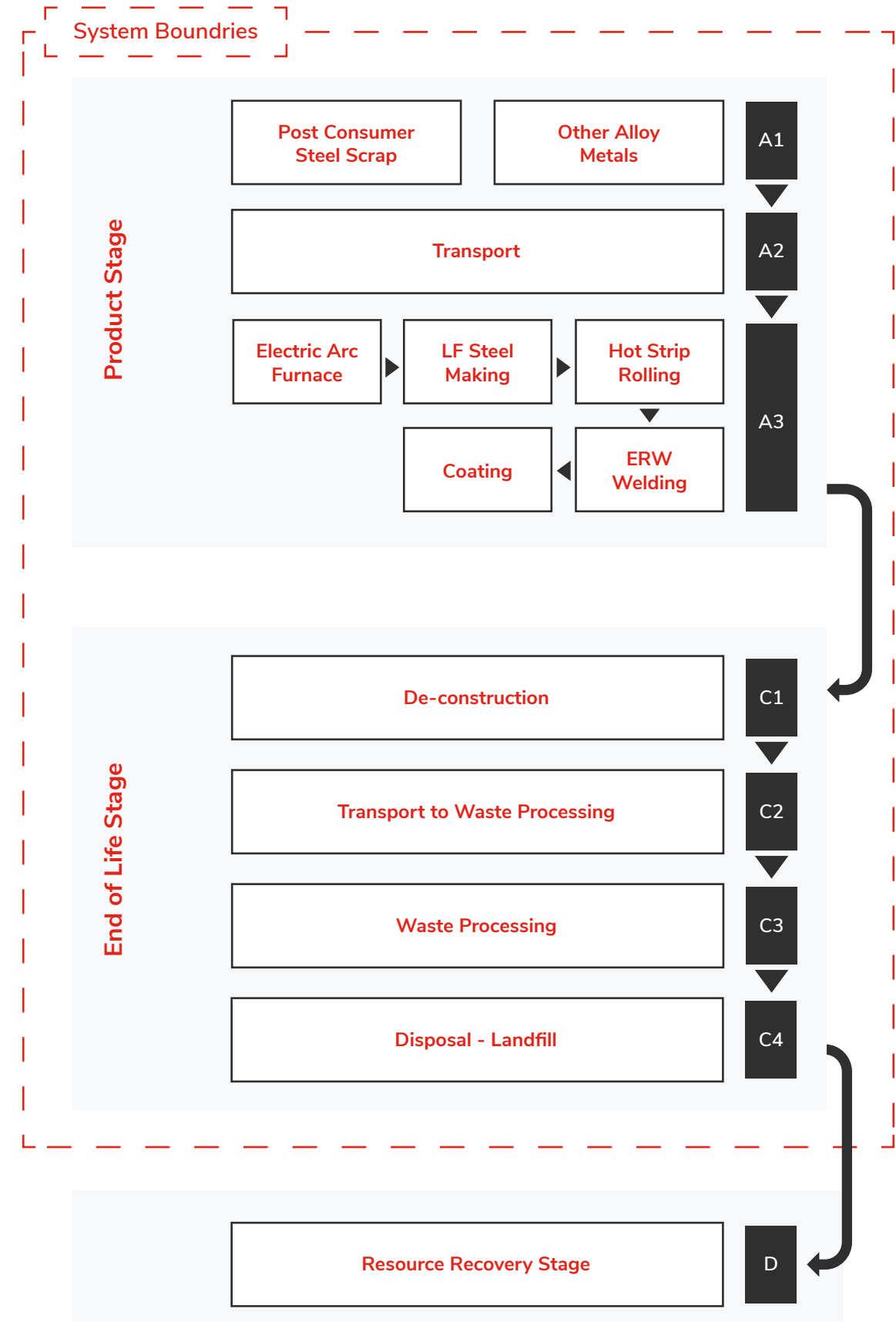
Life Cycle Inventory data for a minimum of 99% of total inflows to the three life cycle stages have been included and a cut-off rule of 1% regarding energy, mass and environmental relevance was applied. Impacts caused by treatment operations have been calculated lower than 1% environmental relevance.

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

| MODULES | 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 | Operational energy use | Operational water use | De-construction | Transport | Waste processing | Disposal | Reuse - Recovery - Recycling Potential |
| | 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 described in the table below.

| Parameters C2 Module | |
|----------------------|----------------------|
| Transport by road* | Lorry >32 metric ton |
| Distance (km) | 100 |
| Database | Ecoinvent v3.6 |

*Technology is Euro 5

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-construction and recycling, and, 95% is reached to recycling system.

D - Reuse, Recovery or Recycling Potential

Scrap inputs to the production stage are subtracted 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 | 718 | 1.37 | 8.83 | 0 | 0.248 | -13.0 |
| GWP-biogenic | kg CO ₂ eq | 3.58 | 0.014 | 0.005 | 0 | 0.000 | -0.212 |
| GWP-luluc | kg CO ₂ eq | 3.55 | 0.002 | 0.003 | 0 | 6.91E-05 | -0.041 |
| GWP-total | kg CO ₂ eq | 725 | 1.3818 | 8.83 | 0 | 0.248 | -13.22 |
| ODP | kg CFC 11eq | 3.65E-05 | 9.16E-08 | 2.00E-06 | 0 | 1.02E-07 | -1.20E-06 |
| AP | mol H+ eq | 4.14 | 0.007 | 0.04 | 0 | 0.002 | -0.097 |
| EP-Freshwater | kg PO43- eq | 0.391 | 0.001 | 0.005 | 0 | 3.14E-04 | -0.012 |
| | kg P eq | 0.044 | 9.96E-05 | 7.88E-05 | 0 | 2.78E-06 | -0.001 |
| EP-Marine | kg N eq | 0.724 | 0.001 | 0.011 | 0 | 8.09E-04 | -0.023 |
| EP-Terrestrial | kg N eq | 8.12 | 0.014 | 0.123 | 0 | 0.009 | -0.267 |
| POCP | kg NMVOC eq | 2.25 | 5.43E-03 | 0.039 | 0 | 0.003 | -0.091 |
| ADP-minerals & metals* | kg Sb eq | 0.002 | 1.80E-05 | 1.48E-04 | 0 | 2.27E-06 | -1.01E-04 |
| ADP-fossil* | MJ | 6964 | 19.3 | 135 | 0 | 6.93 | -231 |
| WDP | m ³ | 178 | 0.87 | 0.491 | 0 | 0.311 | -4.87 |

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

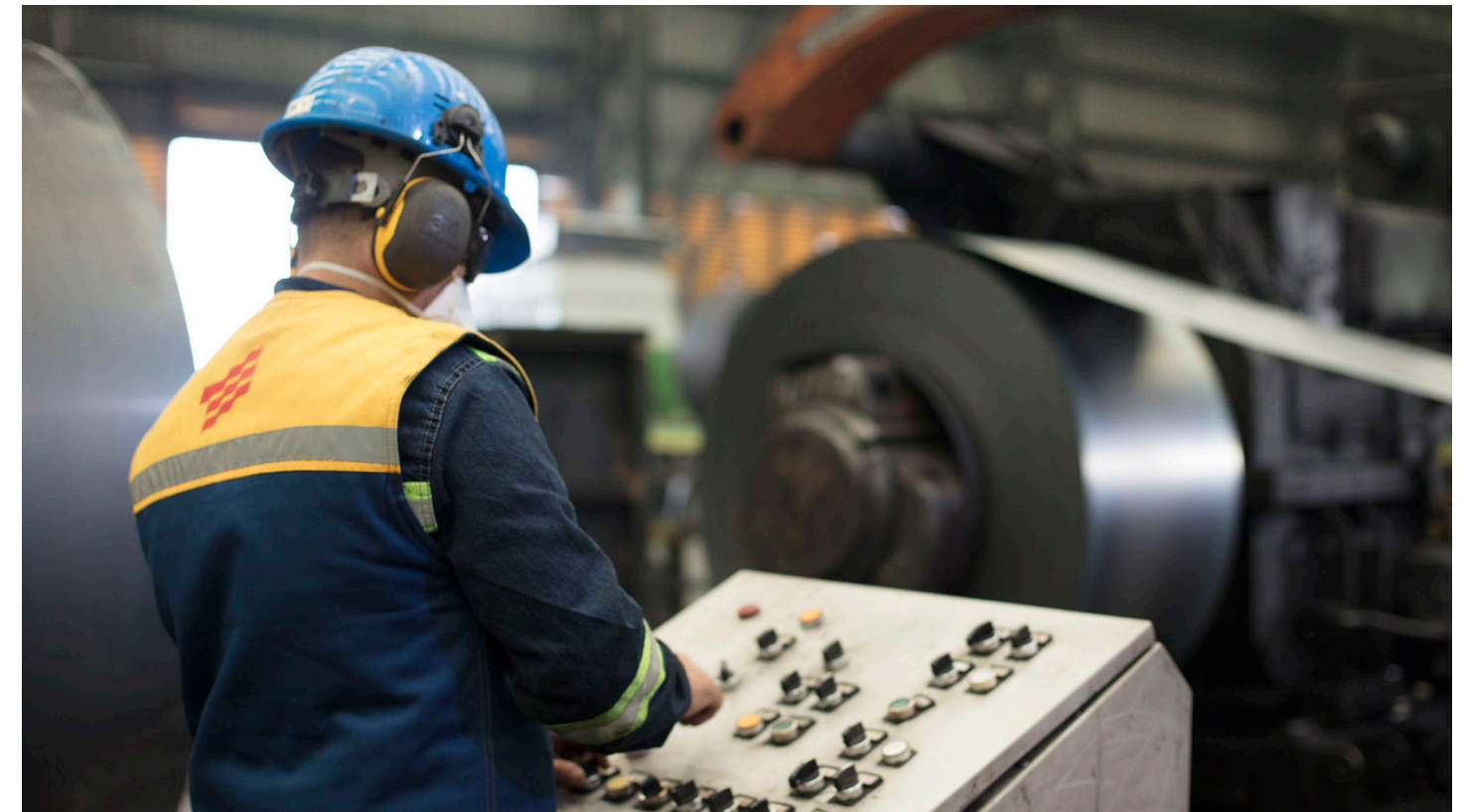
* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

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 | 715 | 1.33 | 8.75 | 0 | 0.243 | -12.752 |
| Results according to EN 15804+A2 for 1000 kg of ERW Pipe | | | | | | | |
| PM | [disease inc.] | 2.68E-05 | 3.88E-07 | 7.83E-07 | 0 | 4.57E-08 | -1.18E-05 |
| IRP | [kBq U235 eq] | 8.30 | 0.102 | 0.569 | 0 | 0.028 | -1.38 |
| ET-freshwater | [CTUe] | 5817 | 45.4 | 115.631 | 0 | 4.496 | -532.701 |
| HT-cancer | [CTUh] | 6.82E-07 | 2.91E-08 | 2.67E-09 | 0 | 1.04E-10 | -4.91E-07 |
| HT-non-cancer | [CTUh] | 4.48E-06 | 9.74E-08 | 1.23E-07 | 0 | 3.21E-09 | -1.79E-07 |
| SQP | [pt] | 804 | 5.31 | 152 | 0 | 15 | -98 |

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 | 1051 | 2 | 1.451 | 0 | 0.056 | -55.88 |
| PERM | MJ | 0 | 0 | 0 | 0 | 0 | 0 |
| PERT | MJ | 1051 | 2 | 1.451 | 0 | 0.056 | -55.878 |
| PENRE | MJ | 7596 | 20 | 143.3 | 0 | 7.361 | -244.8 |
| PENRM | MJ | 0.00 | 0 | 0 | 0 | 0 | 0 |
| PENRT | MJ | 7596 | 20 | 143.3 | 0 | 7.361 | -244.8 |
| 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 | m ³ | 27.18 | 0.155 | 0.117 | 0 | 0.011 | -1.37 |

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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