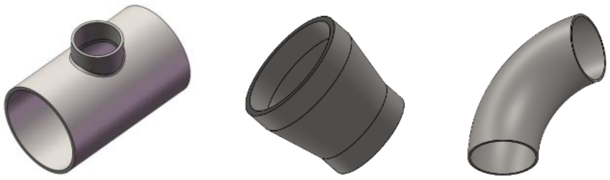


General Information

Information on the EPD Programme

Programme:	SRC EPD program v.1.0
Programme operator:	Silk Road Certification Sp. z o.o.
EPD registration number:	SRC/2026/03/23/EPD/02
Publication date:	2026-03-23
Valid until:	2029-03-22
Standard:	EN 15804:2012+A2:2019
EPD Type:	Cradle-to-gate
Declared Unit:	1 kg of product

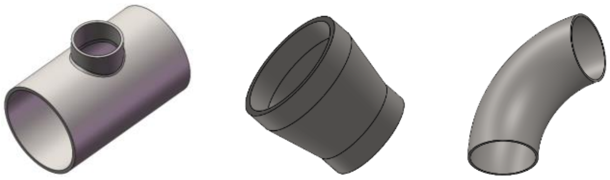
Manufacturer

Tasta Armatura Sp. z o.o.
ul. Władysława Grabskiego 38
37-450 Stalowa Wola
NIP: 8650013543
Polska

Product Description

The subject of this environmental declaration are **steel pipe fittings** such as:

- Hamburg elbows type 2D, 3D, 5D according EN 10253-2 : 2007,
- Hamburg elbows type 2D, 3D, 5D according DIN 2605-1,
- elbows according ANSI B16.9 type LR,
- elbows according ANSI B16.9 type SR,
- Hamburg elbows type 2D, 3D, 5D, according EN 10253-1:1999,
- Bend elbows,
- tees according EN 10253-2,
- tees according DIN 2615-1,
- tees according ANSI B16.9,



- concentric and eccentric reducers according DIN 2616,
- symmetric and asymmetric reducers

manufactured from **carbon steel pipes**.

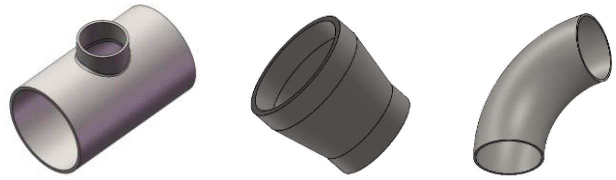
The product group includes fittings with nominal diameters ranging from **DN15 to DN1000,** manufactured in the same production facility and based on the same manufacturing technology.

The production process includes:

- preparation of material (cutting pipes into sections, inspection of incoming material),
- plastic forming (e.g., bending, expanding, narrowing),
- mechanical processing (beveling, calibration, deburring),
- heat treatment – electric furnace (if applicable),
- quality control and non-destructive testing,
- marking.

Products covered by this declaration (Hamburg elbows, reducers, and tees within DN15–DN1000) are manufactured using the same technology and the same unit operations.

Consumption of materials, electricity, and other utilities was collected for the **total annual production of the facility**. These data were referenced to the declared unit of **1 kg of finished product** through



mass allocation, i.e., proportionally to the share of the mass of individual products in the total production mass during the analysed period.

Mass allocation was considered appropriate because energy consumption, material consumption, and waste generation are directly proportional to the mass of processed material and do not significantly depend on the type of fitting or nominal diameter (DN).

In the analysed facility, there are no significant technological differences between product variants that would justify the use of another allocation key.

The intensity of utility consumption (kWh/kg, kg/kg) and the scrap generation rate are proportional to the product mass and do not significantly depend on the nominal diameter (DN).

LCA Analysis Information

Declared Unit

The declared unit is:

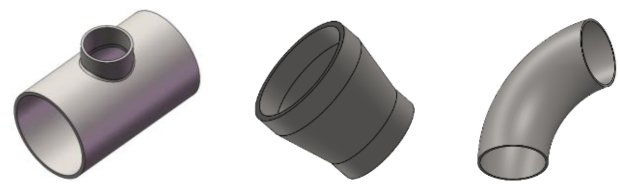
1 kg of finished steel pipe fitting

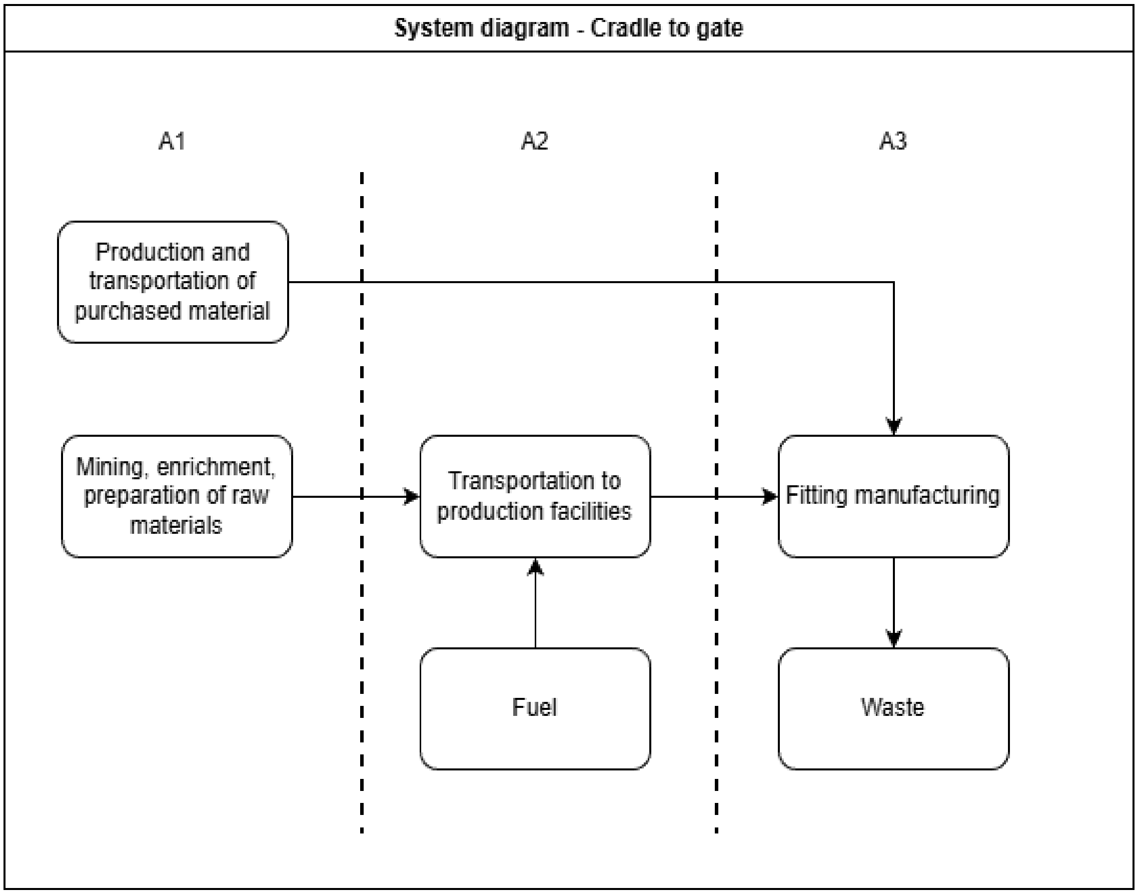
System Boundaries

The analysis includes **modules A1–A3** in accordance with **EN 15804**.

Module	Description
A1	production of steel material
A2	transport of materials to the facility
A3	manufacturing process of fittings

The use phase and end-of-life stage were not included in the analysis.





Cut-off Criteria

Flows contributing less than 1% of mass and environmental impact were excluded, in accordance with the requirements of EN 15804.

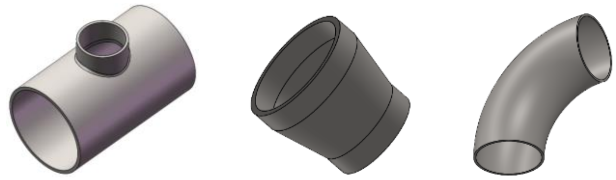
Allocation

During the production process, steel scrap is generated as a result of forming and mechanical processing operations.

The amount of scrap was determined based on production data as the difference between the mass of steel input and the mass of the finished product.

For the declared unit of 1 kg of finished fitting, 1.10 kg of steel pipe is required, which corresponds to approximately 10% material losses.

Scrap was modelled according to the “system model cut-off” approach of the ecoinvent 3.1 database, as a material flow directed to recycling without granting an environmental credit to the producer, in



accordance with the requirements of EN 15804+A2

Methodology

The assessment was carried out based on the following standard:

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

The EN 15804+A2 standard acts as the Core PCR (c-PCR) for construction products and constitutes the methodological basis for the preparation of this Environmental Product Declaration (EPD).

Additionally applied standards:

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

Impact assessment method:

Environmental Footprint Method (EF) 3.1

Since the analysed product (steel pipe fittings) is a construction product within the meaning of the Construction Products Regulation (CPR), EN 15804+A2 was applied as the valid PCR.

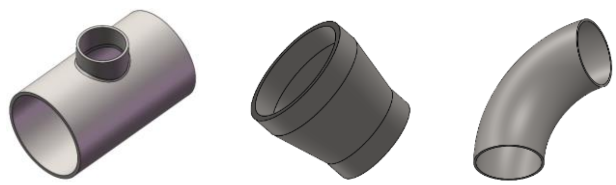
No additional sector-specific PCR (e.g., for steel products) was used because EN 15804+A2 constitutes the appropriate reference document for this category of products.

Input Data (LCI)

Primary Data

Primary data include:

- consumption of steel pipe,
- electricity consumption,
- amount of generated scrap.



Input Data per Declared Unit

Table 1. Input Data of the Production Process

Flow	Value	Unit	Module
Steel pipe	1,10	Kg	A1
Electricity	1,7	kWh	A3
Material transport	0,20	t*km	A2

Environmental Impact Assessment (LCIA)

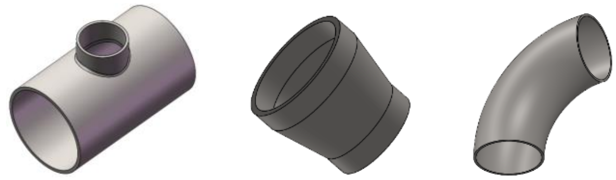
Impact Assessment Method

Environmental impact assessment was conducted using the method:

Environmental Footprint Method (EF) 3.1

This method is consistent with the requirements of EN 15804+A2 and with the European Commission recommendations regarding Product Environmental Footprint (PEF).

Results are presented without normalization and weighting.



The applied LCIA method includes mandatory and additional environmental indicators in accordance with EN 15804+A2.

Impact Categories

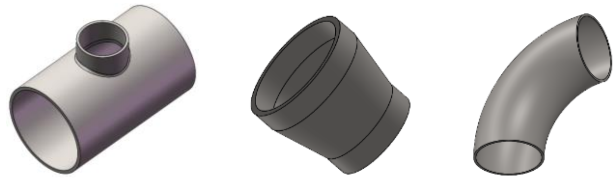
The following environmental indicators were analysed:

- climate change,
- acidification,
- fossil resource use,
- water consumption,
- eutrophication,
- toxicity for human,
- ozone layer depletion,
- tropospheric ozone formation,
- particulate matter emissions.

Environmental Impact Results

Table 2. LCIA Results for the Declared Unit (A1–A3)

Indicator	Unit	Result A1–A3
Climate change	kg CO_2 eq	3,75836E+00
Climate change – fossil fuel	kg CO_2 eq	3,74978E+00
Climate change – biogenic	kg CO_2 eq	7,52025E-03
Climate change – land use	kg CO_2 eq	1,05553E-03
Acidification	mol H^+ eq	9,94754E-03
Freshwater eutrophication	kg P eq	2,21310E-03



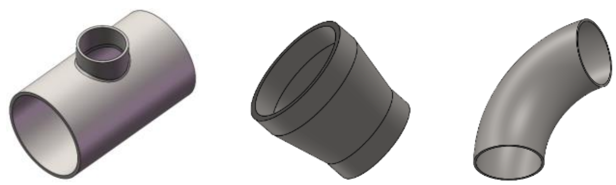
Marine eutrophication	kg N eq	2,59692E-03
Terrestrial eutrophication	mol N eq	2,51851E-02
Freshwater ecotoxicity	CTUe	7,30444E+00
Toxicity for humans – carcinogenic	CTUh	2,53425E-09
Toxicity for humans – non-carcinogenic	CTUh	6,39258E-08
Ionising radiation	kBq U235 eq	4,59932E-01
Land use	Pt	1,07710E+01
Ozone layer depletion	kg CFC11 eq	3,40623E-08
Particulate matter	disease incidences	1,84302E-07
Photochemical ozone formation	kg NMVOC eq	9,67650E-03
Fossil resource use	MJ	3,61805E+01
Mineral and metal resource use	kg Sb eq	2,15046E-05
Water use	m^3 world eq	-5,23331E-01

The negative value of the “Water use” indicator results from the application of the “cut-off” system model in the ecoinvent database and from the inclusion of energy processes in which credits related to water recovery occur within the supply chain. This value does not indicate a physical return of water at the production facility.

Process contribution analysis

Climate change

Steel material production constitutes the dominant source of environmental impact in this category.



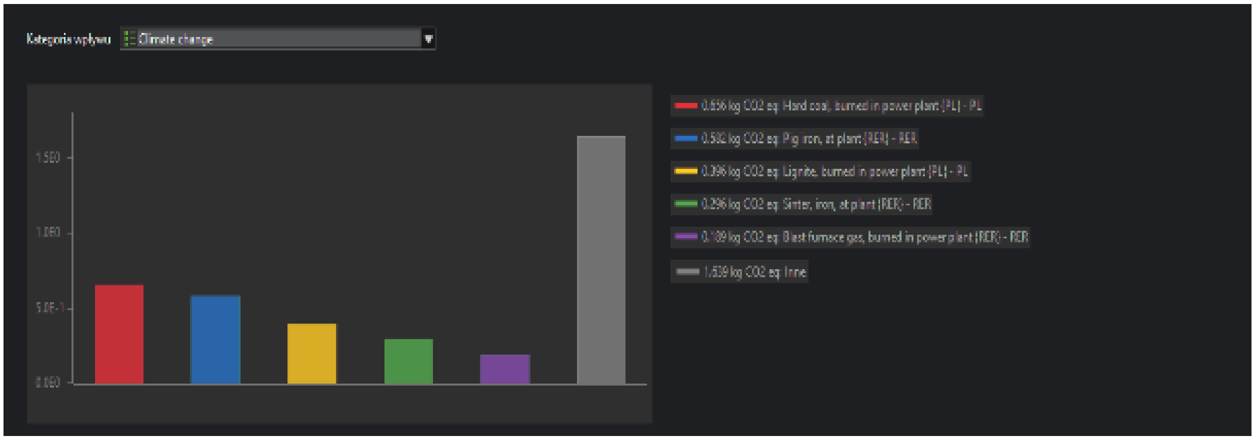


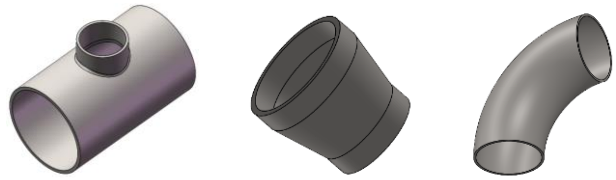
Figure 1. Process contribution analysis – Climate change

Acidification

The largest contribution to environmental acidification comes from emissions associated with metallurgical processes in module A1.

Figure 2. Process contribution analysis – Acidification

Fossil resource use



Fossil resource use is dominated by steel material production.

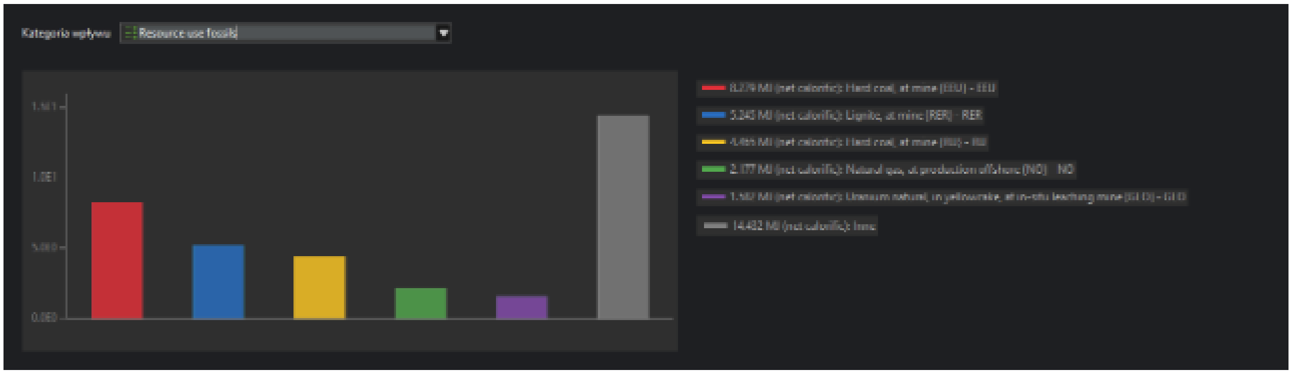


Figure 3. Process contribution analysis – Fossil resource use

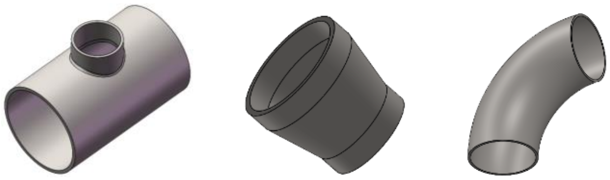
Water use

The value of the "Water use" indicator is primarily determined by processes related to steel material production in the supply chain (A1).

Negative contributions of certain processes result from the applied system model (ecoinvent cut-off) and from the inclusion of environmental credits in upstream processes.

There is no direct technological water consumption at the production facility.

Figure 4. Process contribution analysis – Water use



Mineral and metal resource use

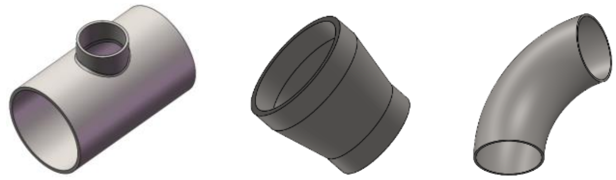
Figure 5. Process contribution analysis – Mineral and metal resource use

The “Mineral and metal resource use” indicator (kg Sb eq) is determined mainly by mining and processing of metallic raw materials used in steel production in module A1.

The largest share in this category comes from processes related to the mining and beneficiation of alloy metal ores such as chromium, molybdenum, and zinc, which occur as alloying elements or as associated processes in steel production.

The contribution of module A2 (transport) and module A3 (manufacturing process at the facility) is marginal compared to stage A1.

The result reflects the use of non-renewable resources in the steel material supply chain rather than the direct consumption of metals at the production facility.



Interpretation of Results

The analysis results indicate that the greatest environmental impact is associated with steel material production (module A1), which is characteristic of steel products assessed in a cradle-to-gate system.

Material transport (A2) and the manufacturing process at the facility (A3) have a significantly smaller share in the total environmental impact.

Data Quality and Representativeness

Primary data refer to the year 2025 and represent the actual production conditions at the Tasta Armatura Sp. z o.o. facility in Poland.

Electricity consumption, use of process water and the amount of generated scrap were determined on the basis of annual data and related to the total mass of manufactured fittings, and subsequently recalculated to the declared unit of 1 kg of product.

Secondary data concerning steel production, electricity generation, and transport originate from the ecoinvent 3.1 database (cut-off system model) used in the openLCA software.

Geographical representativeness:

For stage A3 (production at the facility) is high (Poland), whereas for stages A1–A2 it corresponds to European data contained in the LCA database. The data were considered complete and representative for the analysed product group.

Standards and References

- ISO 14040
- ISO 14044
- EN 15804+A2
- EF 3.1 Method
- ISO 14025:2006

LCA Model Settings

Parametr	Value
Software	openLCA
Method	EF 3.1
Database	Ecoinvent 3.1
System model	Cut-off
Declared unit	1 kg
Reference data year	2025

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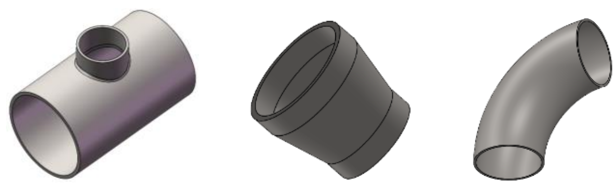


LCA Model Documentation and Export of Results

The life cycle assessment model was developed in openLCA software using the ecoinvent 3.1 database (cut-off system model) and the Environmental Footprint (EF) 3.1 impact assessment method compliant with EN 15804+A2.

The model covers modules A1–A3:

- A1 steel material production,
- A2 – transport of materials to the facility,
- A3 – fittings manufacturing process at the facility in Poland.

All LCIA results presented in this document were generated directly from the openLCA model for the declared unit of 1 kg of finished steel pipe fitting (average product DN15–DN1000).

The export of results from the openLCA software constitutes the technical documentation of the model and is available for review during the verification process.

Environmental Product Declaration (EPD) – Pipe Fittings (Cradle-to-Gate)

Introduction

This report presents the results of the life cycle assessment (LCA) of steel pipe fittings manufactured in Poland. The study was carried out in accordance with ISO 14040 and ISO 14044 standards and is based on the principles of EN 15804 concerning Environmental Product Declarations (EPD).

The analysis covers cradle-to-gate system boundaries, including raw material acquisition, transport, and the manufacturing process. The declared unit is 1 kg of finished pipe fitting.

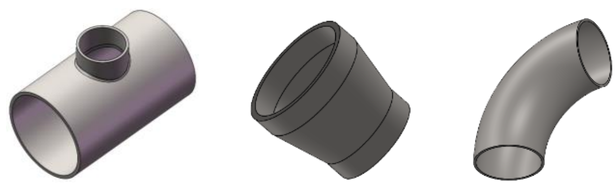
The product covered by this study includes pipe fittings with nominal diameters ranging from DN 15 (21.3 mm) to DN 1000 (1016 mm), made of P235GH or S235 carbon steel.

The report was prepared for Tasta Armatura Sp. z o.o. and external stakeholders as documentation supporting the creation of an Environmental Product Declaration (EPD).

Product Variants

The table below presents the analysed product system. In accordance with Environmental Product Declaration (EPD) requirements, one product variant was included.

The openLCA software is a commonly used tool for LCA analyses compliant with ISO 14040/14044. The applied EF 3.1 method and the ecoinvent 3.1 database comply with EN 15804+A2 requirements.

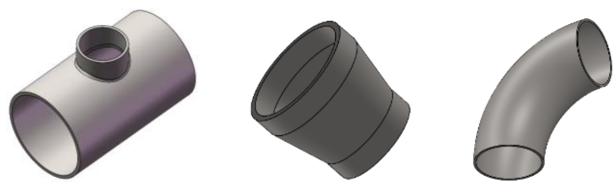


Product variant	Description
Hamburg elbow	DN 15/21,3 – DN 1000/1016, P235GH or S235 steel
Steel reducer	DN 15/21,3 – DN 1000/1016, P235GH steel
Pipe tee	DN 15/21,3 – DN 1000/1016, P235GH steel

Environmental Impact Categories

The table below presents the environmental impact categories included in this study, in accordance with the applied Life Cycle Impact Assessment (LCIA) method.

Indicator	Unit	Description
Acidification	mol H^+ eq	Acidification potential of the environment
Climate change	kg CO_2 eq	Total global warming potential (GWP)
Climate change – biogenic	kg CO_2 eq	Emissions related to carbon of biological origin
Climate change – fossil fuel	kg CO_2 eq	Emissions related to fossil fuels
Climate change – land use	kg CO_2 eq	Emissions resulting from land use changes
Freshwater ecotoxicity	CTUe	Potential toxicity to aquatic organisms
Freshwater ecotoxicity (inorganic)	CTUe	Contribution of inorganic compounds
Freshwater ecotoxicity (organic)	CTUe	Contribution of organic compounds
Freshwater eutrophication	kg P eq	Freshwater eutrophication potential
Marine eutrophication	kg N eq	Marine eutrophication potential
Terrestrial eutrophication	mol N eq	Terrestrial eutrophication potential
Toxicity for humans – carcinogenic	CTUh	Potential carcinogenic effects
Toxicity for humans – carcinogenic (inorganic)	CTUh	Contribution of inorganic compounds
Toxicity for humans – carcinogenic (organic)	CTUh	Contribution of organic compounds
Toxicity for humans – non-carcinogenic	CTUh	Potential non-carcinogenic toxic effects
Toxicity for humans – non-carcinogenic (inorganic)	CTUh	Contribution of inorganic compounds
Toxicity for humans – non-carcinogenic (organic)	CTUh	Contribution of organic compounds
Ionising radiation (human health)	kBq U235 eq	Potential impact of ionising radiation
Land use	dimensionless (pt)	Impact related to land occupation and transformation
Ozone layer depletion	kg CFC11 eq	Ozone depletion potential

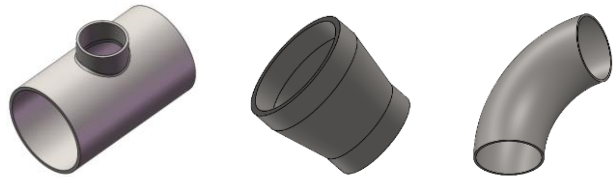


Particulate matter	disease incidences	Impact of particulate emissions on human health
Tropospheric ozone formation (human health)	kg NMVOC eq	Potential for ground-level ozone formation
Fossil resource use	MJ (netto)	Use of fossil fuels
Mineral and metal resource use	kg Sb eq	Use of mineral and metal resources (antimony equivalent)
Water use	m^3 world eq	Water resource use potential accounting for regional water scarcity

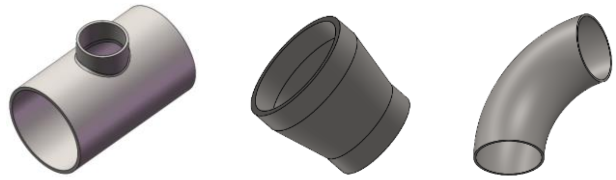
Environmental Impact Assessment Results

The table below presents the results of the life cycle environmental impact assessment for the declared unit of 1 kg of pipe fittings. All results refer to cradle-to-gate system boundaries (A1–A3).

Indicator	Value	Unit
Acidification	9.94754E-03	mol H^+ eq
Climate change	3.75836E+00	kg CO_2 eq
Climate change – biogenic	7.52025E-03	kg CO_2 eq
Climate change - fossil fuels	3.74978E+00	kg CO_2 eq
Climate change – land use	1.05553E-03	kg CO_2 eq
Freshwater ecotoxicity	7.30444E+00	CTUe
Freshwater ecotoxicity (inorganic)	6.99256E+00	CTUe
Freshwater ecotoxicity (organic)	3.11884E-01	CTUe
Freshwater eutrophication	2.21310E-03	kg P eq
Marine eutrophication	2.59692E-03	kg N eq
Terrestrial eutrophication	2.51851E-02	mol N eq
Toxicity for humans – carcinogenic	2.53425E-09	CTUh
Toxicity for humans – carcinogenic (inorganic)	1.29548E-09	CTUh
Toxicity for humans – carcinogenic (organic)	1.23877E-09	CTUh
Toxicity for humans – non-carcinogenic	6.39258E-08	CTUh
Toxicity for humans – non-carcinogenic (inorganic)	6.25891E-08	CTUh
Toxicity for humans – non-carcinogenic (organic)	1.33669E-09	CTUh
Ionising radiation (human health)	4.59932E-01	kBq U235 eq
Land use	1.07710E+01	dimensionless (pt)
Ozone layer depletion	3.40623E-08	kg CFC11 eq
Particulate matter	1.84302E-07	disease incidences
Tropospheric ozone formation (human health)	9.67650E-03	kg NMVOC eq



Fossil resource use	3.61805E+01	MJ (net calorific value)
Mineral and metal resource use	2.15046E-05	kg Sb eq
Water use	-5.23331E-01	m^3 world eq



Analysis and Interpretation of Results

Structure of Environmental Impact

The process contribution analysis showed that stage A1 – steel material production – has the dominant share in most environmental impact categories. This is characteristic of steel products assessed within a cradle-to-gate system.

Stage A2 (material transport) has a limited impact on the overall environmental results, whereas stage A3 (the manufacturing process at the facility) is primarily responsible for impacts related to electricity consumption.

Climate Change

The largest share of greenhouse gas emissions is attributable to steel production (A1). Electricity consumption at the production facility constitutes a significant, though considerably smaller, share of the total GWP indicator.

Fossil Resource Use

The “Fossil resource use” category is dominated by metallurgical processes and steel material production. Transport and manufacturing operations have a marginal impact compared to stage A1.

Acidification and Eutrophication

Impacts in these categories arise primarily from emissions accompanying steel production within the supply chain. Emissions related to on-site manufacturing are of secondary importance.

Water Use

The negative value of the “Water use” indicator results from the application of the “cut-off” system model in the ecoinvent database and from the inclusion of environmental credits in energy processes within the supply chain. This value does not indicate a physical return of water at the production facility.

Conclusions

The analysis results indicate that the key factor affecting the environmental footprint of steel pipe fittings is steel material production. Environmental impact optimisation should primarily focus on:

- selection of materials with a lower carbon footprint,
- increasing the share of recycled steel,
- improving energy efficiency within the supply chain.

The manufacturing process at the analysed facility, calculated per 1 kg of product, constitutes a relatively small share of the total environmental impact.