

# Environmental Product Declaration

of multiple products, based on the average results of the product group.

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

## ***Pipe Fittings made from stainless steel, aluminium alloys and nickel alloys***

from

**Erne Fittings GmbH**



Programme:	The International EPD System, <a href="http://www.environdec.com">www.environdec.com</a>
Programme operator:	EPD International AB
Type of EPD:	EPD of multiple products from a company
EPD registration number:	EPD-IES-0026295:001
Version date:	2025-12-10
Validity date:	2030-12-10

*An EPD may be updated or depublished if conditions change. To find the latest version of the EPD and to confirm its validity, see [www.environdec.com](http://www.environdec.com)*



*A detailed  
description of  
products included in  
this EPD can be  
found on page 4.*

## GENERAL INFORMATION

Programme Information	
<b>Programme:</b>	The International EPD® System
<b>Address:</b>	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
<b>Website:</b>	<a href="http://www.environdec.com">www.environdec.com</a>
<b>E-mail:</b>	<a href="mailto:support@environdec.com">support@environdec.com</a>

Product Category Rules (PCR)
<b>CEN standard EN 15804 serves as the Core Product Category Rules (PCR)</b>
<b>Product Category Rules (PCR):</b> PCR 2019:14 Construction products version 2.0.1 and UN CPC code: 4129 – Tubes, pipes and hollow profiles of cast-iron and cast-steel and related fittings; tube or pipe fittings of steel other than cast
<b>PCR review was conducted by:</b> The Technical Committee of the International EPD System. A full list of members is available on <a href="http://www.environdec.com">www.environdec.com</a> .
<b>Chair of the PCR review:</b> Rob Rouwette (chair), Noa Meron (co-chair). The review panel may be contacted via the Secretariat <a href="http://www.environdec.com/support">www.environdec.com/support</a> .
<b>c-PCR, if applicable:</b> <i>not applicable</i>

LCA Accountability
LCA accountability: Steffen Albers, DEKRA Assurance Services GmbH, Handwerkstraße 15, 70565 Stuttgart, Germany

Third-party Verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
<input checked="" type="checkbox"/> <b>Individual EPD verification without a pre-verified LCA/EPD tool</b> Third-party verifier: Manfred Russ (Mail: <a href="mailto:manfred@russ-lca.com">manfred@russ-lca.com</a> ).
Approved by: International EPD System
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but published in different EPD programmes, may not be comparable. For two EPDs to be comparable, they shall be based on the same PCR (including the same first-digit version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have identical scope in terms of included life-cycle stages (unless the excluded life-cycle stage is demonstrated to be insignificant); apply identical impact assessment methods (including the same version of characterisation factors); and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

## INFORMATION ABOUT EPD OWNER

Owner of the EPD: Erne Fittings GmbH

Address: Hauptstraße 48, 6824 Schlins, Austria

Contact: Christopher Schragl (Christopher.Schragl@ernefittings.com)

Address and contact information of the LCA practitioner commissioned by the EPD owner, if applicable: DEKRA Assurance Services GmbH, Handwerkstraße 15, 70565 Stuttgart, Germany

Description of the organisation:

Erne Fittings GmbH, headquartered in Schlins, Austria, is a globally leading manufacturer of high-quality butt-weld fittings for piping systems. Since its founding in 1920, the company has stood for top quality, safety, and innovation in connection technology.

With over 100 years of experience, Erne Fittings produces permanently weldable pipe connections made from steel materials – including elbows, tees, and reducers – for demanding and regulated applications. These include power plants, pipelines, refineries, tankers, offshore platforms, chemical and industrial plants, as well as general mechanical engineering.

Erne Fittings positions itself as a reliable premium partner for customers worldwide. The combination of technical expertise, international presence, and a deep understanding of customer requirements makes the company a preferred supplier in both project and distribution business.

In addition to a comprehensive stock program, Erne Fittings also offers customized special solutions and manufactures over 3,000 items in various dimensions, materials, and wall thicknesses – always in accordance with international standards and with the highest quality requirements.

With production and sales locations in Europe and America, Erne Fittings pursues a global strategy based on customer proximity, reliability, and sustainable growth.

Product-related or management system-related certifications:

Erne Fittings meets the highest quality and safety standards, holding certifications for quality management (ISO 9001:2015-09, 2015), (ISO 19443:2018, 2018), laboratory and testing competence (EN ISO/IEC 17025:2017, 2017), and personnel qualification in non-destructive testing (EN ISO 9712, 2021).

## PRODUCT INFORMATION

Product name: Pipe Fittings

Product identification:

The EPD covers multiple pipe fittings. It is based on 1 kg of an average product.

There are two types of pipe fittings produced by Erne Fittings: the stock program and customer specific solutions. The materials and sizes in the stock program are highlighted in the following, while the customer specific solutions will be not disclosed publicly, but they are also covered by this EPD.

Variant	Material group	Material	Wall thickness (mm)	Diameter (mm)	Angle (Degrees)	Weight (kg)
Bends	Al-Alloys	AlMg4.5Mn/EN_AW-5083-O	2.87 - 5.54	26.67 - 88.9	90	0.03 - 0.7
		AlMgSi/EN_AW-6060	2 - 5	25 - 168.3	90 - 180	0.02 - 2.23
	Chromium steels	WP_304/304L-S	2.11 - 12.7	21.34 - 323.85	45 - 90	0.03 - 49
		WP_316/316L-S	2.11 - 18.26	21.34 - 323.85	45 - 90	0.03 - 53
		UNS-S31803-S/UNS-S32205-S	2.11 - 18.26	21.34 - 219.07	45 - 90	0.03 - 26.64
		UNS-S32750-S	2.11 - 18.26	21.34 - 219.07	45 - 90	0.02 - 26
	Ni-Alloys	WPNCMC-S_(Inconel_625)	3.05 - 18.29	33.4 - 219.07	45 - 90	0.16 - 16.38
		WPNICMC-S_(Incoloy825)	4.78	114.3	90	3.18
Tees	Al-Alloys	AlMgSi/EN_AW-6060	3 - 5	60 - 114	60 - 114	0.3 - 1.64
	Chromium steels	1.4404-W_/WP_316L-W	1.5 - 3.2	17.2 - 323.9	17.2 - 323.9	0.052 - 21
		1.4432-W	1.5 - 3	20 - 306	20 - 306	0.08 - 14.22
		N_/1.4541-S	1.5 - 12.7	17.2 - 273	17.2 - 273	0.05 - 31
		N_/1.4541-W	2 - 7.1	21.3 - 323.9	21.3 - 323.9	0.08 - 49.4
		Q_/1.4571-S	1.6 - 12.5	17.2 - 323.9	17.2 - 323.9	0.07 - 42.8
		Q_/1.4571-W	1.6 - 6	21.3 - 323.9	21.3 - 323.9	0.08 - 47
		WP_304/304L-S	2.11 - 18.26	21.34 - 323.85	21.34 - 323.85	0.08 - 50
		WP_304/304L-W	2.77 - 7.11	60.32 - 168.27	60.32 - 114.3	0.84 - 10.8
		WP_316/316L-S	2.11 - 13.49	21.34 - 323.85	21.34 - 323.85	0.12 - 55.7
		UNS-S31803-S/UNS-S32205-S	2.11 - 18.26	21.34 - 219.07	21.34 - 219.07	0.08 - 34.5
	UNS-S32750-S	2.11 - 18.26	21.34 - 219.07	21.34 - 219.07	0.08 - 31.5	
	Ni-Alloys	WPNCMC-S_(Inconel_625)	3.05 - 8.74	21.34 - 114.3	21.34 - 114.3	0.14 - 7.21
		WPNICMC-S_(Incoloy825)	2.77 - 5.49	33.4 - 114.3	26.67 - 60.32	0.31 - 2.73
Reducers	Al-Alloys	AlMgSi/EN_AW-6060	3 - 5	89 - 108	60 - 89	0.21 - 0.45
	Chromium steels	N_/1.4541-S	2.6 - 12.5	33.7 - 323.9	21.3 - 219.1	0.13 - 11.4
		N_/1.4541-W	2 - 5.6	48.3 - 323.9	33.7 - 273	0.16 - 8.26
		Q_/1.4571-S	2 - 8.8	26.9 - 323.9	21.3 - 273	0.07 - 12.5
		Q_/1.4571-W	2 - 3.6	33.7 - 323.9	21.3 - 273	0.08 - 6.2
		WP_304/304L-S	2.77 - 12.7	26.67 - 219.07	21.34 - 168.27	0.07 - 12
		WP_316/316L-S	2.77 - 12.7	26.67 - 323.85	21.34 - 273.05	0.07 - 15.9
		UNS-S31803-S/UNS-S32205-S	2.77 - 18.26	33.4 - 219.07	21.34 - 168.27	0.1 - 12
		UNS-S32750-S	3.05 - 18.26	26.67 - 219.07	21.34 - 168.27	0.09 - 7.76
	Ni-Alloys	WPNCMC-S_(Inconel_625)	3.05 - 22.23	60.32 - 273.05	26.67 - 168.27	0.35 - 71

Visual representation (e.g., an image) of the product:



UN CPC code: 4129 - Tubes, pipes and hollow profiles of cast-iron and cast-steel and related fittings; tube or pipe fittings of steel other than cast

Product description:

The products fulfill following functions: It provides a tight, leak-proof and corrosion-resistant connection in piping systems with a high resistance to pressure, temperature and chemical exposure. The products are in compliance with ED 2014/68/EU, KTA 3201, PER 2016/1105, and the AD2000 Code and hold the following Standards EN10253; DIN 2605, 2615, 2616, 2609; NF A 49-281, A 49-289; ASME SA-234, SA-403, SA-420, SA-815, SA-960; ASTM A234, A420, A403, A815, A860, A960, B366; MSS SP 75, SP 43; CSA Z245.11.

Name and location of production site(s): Erne Fittings GmbH: Hauptstraße 48, 6824 Schlins, Austria and Bleckmanngasse 20, 8680 Müzzuschlag, Austria

References to any relevant websites for more information or explanatory materials, if applicable:  
<https://ernefittings.com/en/>

## CONTENT DECLARATION

Description of the main components and/or materials: Quantity for 1 declared unit is 1 kg of the average product.

Product content	Mass, kg	Post-consumer recycled material, mass-% of product	Biogenic material, mass-% of product	Biogenic material, kg C/product or declared unit
Chromium steels	0.92	64.40 %	0	0
Ni-Alloys	0.04	NA	0	0
Al-Alloys	0.04	NA	0	0
TOTAL	1.00	64.40 %	0	0

Packaging materials	Mass, kg	Mass-% (versus the product)	Biogenic material, kg C/product or declared unit
Pallet	0.09	9.0	0.04
Paperboard	0.01	1.0	3.8E-03
TOTAL	0.1	10.0%	0.04

1 kg biogenic carbon in the product/packaging is equivalent to the uptake of 44/12 kg of CO<sub>2</sub>.

Information on the environmental and hazardous/toxic properties of a substances contained in the product:

None of the substances used during production are classified as persistent, bioaccumulative and toxic (PBT) or substances of very high concern (SVHC) according to Regulation No. 1907/2006 Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Hazardous substances from the candidate list of SVHC	EC No.	CAS No.	Mass-% per product or declared unit
N/A	N/A	N/A	N/A

## LCA INFORMATION

Compliance with standards

The LCA and EPD have been created to comply with:

- ISO 14040:2006 and ISO 14044:2006+A1:2018 which describe the principles, framework, requirements and provides guidelines for life cycle assessment (LCA) (ISO 14040:2006-07, 2006) (ISO 14044:2006-07, 2006)
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures, which establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations (ISO 14025:2006-07, 2006)
- ISO 14020:2022 Environmental labels and declarations – General principles, which describes the guiding principles for the development and use of environmental labels and declarations (ISO 14020:2022-12, 2022)
- EN 15804+A2:2019/AC:2021: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products (DIN EN 15804:2022-03, 2022)
- EN 15941: Sustainability of construction works – Data quality for environmental assessment of products and construction works (DIN EN 15941:2024-10, 2024)
- PCR 2019:14, v2.0.1 – Construction products (Environdec, 2025a)
- GPI for the International EPD System v5.0.1 – containing instructions regarding methodology and the content that must be included in EPDs registered under the International EPD System (Environdec, 2025b)

Declared unit:

The declared unit is 1 kg of pipe fittings.

The environmental impacts are determined for an average product. I.e., the EPD includes several products of the same product group. The EPD 1 covers the following products:

Pipe fittings with the diameters 1/2" - 42" / 21.33 mm - 1067 mm made from alloyed steel, stainless steel, duplex steel, nickel alloys and aluminium alloys.

The EPD does depict multiple products of the same product group which are available in different sizes and have a different material composition. For the calculation of the weighted average the production volumes of the included products are considered for the reference year 2024.

Reference service life: N/A

Time representativeness: The reference year of the study is the calendar year 2024, covering 12 months of data.

Geographical scope: The geographical scope is Europe.

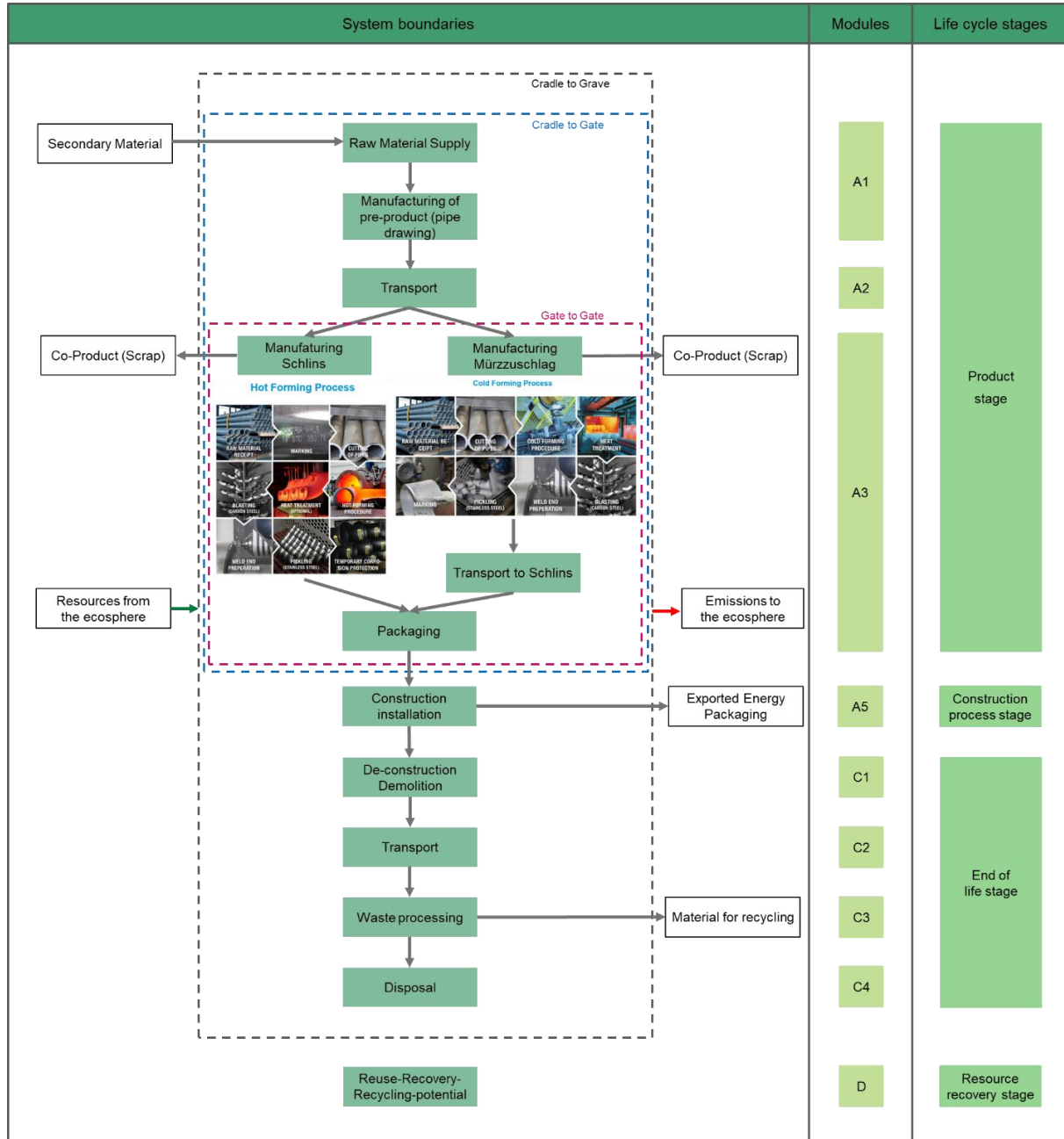
Database(s) and LCA software used: The database used is ecoinvent v3.11 (Wernet et al. 2016 and ecoinvent 2024) with the EN15804 reference package based on Environmental Footprint (EF) 3.1. The LCA software used is Umberto 11.

EPD/LCA Tool used: N/A

Description of system boundaries:

The system boundary is cradle to gate with options, modules C1–C4, module D. The optional module included is A5, so in total modules A1–A3 + C + D and A5 are included. Module A4 is not included because not enough data could be provided to achieve an informative result. The use stage B ist not included because they are highly dependent on the particular application. In addition, the environmental impact of the use phase is considered negligible because it is a passive product that is not removed over an extended period..

Process flow diagram:



### Product stage

The manufacturing of the pipe fittings takes place at the construction facility in Mürzzuschlag and Schlins. There are two different processes, the hot forming process in Schlins and the cold forming process in Mürzzuschlag.

The hot forming process in Schlins includes the following steps:

1. Cutting of the steel pipe: Steel pipes are cut to the required length using saws to prepare the raw material for forming.
2. Hot forming: The cut pipe sections are heated to forming temperature and shaped into elbows, tees, or reducers using hydraulic presses and dies. This ensures the required geometry and wall thickness distribution.
3. Heat treatment: After forming, the fittings undergo heat treatment (e.g., normalizing or quenching and tempering) to restore material properties, relieve stresses, and achieve the specified mechanical characteristics.
4. Blasting: The fittings are shot-blasted to clean the surface, remove scale and residues from hot forming and heat treatment, and prepare the material for further processing.
5. Weld end preparation: The ends of the fittings are machined (typically beveled) to ensure precise weldability and compliance with international welding standards.
6. Apply corrosion protection: Depending on customer and application requirements, surface coatings (e.g., varnish, epoxy, or other protective layers) are applied to prevent corrosion during transport, storage, and installation.
7. Packaging: Finally, the finished fittings are packaged securely, often on pallets and paperboard, ensuring safe delivery to the customer while preventing damage and contamination.

The cold forming process in Mürzzuschlag includes the following steps:

1. Cutting of the steel pipe: Steel pipes are cut to the required lengths using saws to provide the raw material for further processing.
2. Cold forming: At room temperature, the pipe sections are mechanically formed into the desired shapes (e.g., elbows, tees, reducers) using presses and dies. This process allows precise dimensional control without heating.
3. Heat treatment: Following cold forming, the fittings are heat-treated to relieve internal stresses caused by the forming process and to restore the required mechanical properties of the material.
4. Blasting: The surface of the fittings is cleaned through shot blasting to remove scale, oxide layers, and any surface impurities, creating a clean base for subsequent treatment.
5. Pickle/Stain: The fittings undergo pickling or staining, where chemical solutions are applied to remove remaining oxides and contaminants. This improves corrosion resistance and ensures a uniform surface finish.
6. Transport to Schlins: The final packaging is done in Schlins therefore the finished product gets delivered to Schlins.
7. Packaging: Finally, the finished fittings are packaged securely, often on pallets and paperboard, ensuring safe delivery to the customer while preventing damage and contamination.

The modules A1-A3 include the production of raw and auxiliary materials that enter the production processes, as detailed below:

#### A1: Raw material supply

- Modul A1 includes the extraction and processing of raw materials and the manufacturing of the pre-products (seamless and longitudinally welded pipes or forged sleeves made from the

listed raw materials) that serve as input for the manufacturing process taking place at the production facilities in Mürzzuschlag and Schlins

#### A2: Transport to manufacturer

- Modul A2 includes the transportation of the pre-product, i.e., seamless and longitudinally welded pipes or forged sleeves, to Mürzzuschlag and Schlins. The components are delivered by multiple suppliers via truck. The distances for the different suppliers were provided by Erne Fittings GmbH and weighted according to the delivered mass per location

#### A3: Manufacturing

- The manufacturing stage includes all the process steps, material, and energy inputs to produce the Pipe fittings. The product is packaged prior to delivery using wooden pallets and cardboard boxes, in order to ensure protection during transportation and handling. The packaging materials of pre-products are included in the life cycle assessment and their transport to a waste treatment facility is considered. End-of-life treatment of the packaging, such as recycling or thermal recovery, is accounted for according to applicable waste management practices.
- During production, a co-product is generated that meets all PCR criteria; therefore, co-product allocation has been applied in accordance with the PCR.

During production, waste is generated and treated according to the waste allocation procedure.

#### Construction process stage

Module A5 covers the manual installation of the product, with no material losses taken into account. The disposal of packaging materials is assumed to occur via thermal waste treatment.

#### End of life stage

##### C1: Demolition

- This module covers the dismantling of the product. It is assumed, that 100% of the product can be recovered during dismantling.

##### C2: Transport

- Module C2 covers the transport to the waste processing facility. The distance is estimated to be 77 km and the transport is assumed to be done via truck.

##### C3: Waste processing

- Waste processing include material flows to either Module C4 or Module D. It encompasses sorting and compressing of scrap materials. 100% of the material is designated for recycling in Module D.

##### C4: Disposal

- This module is zero, because all pipe fittings are assumed to be recycled.

#### Resource recovery stage

In Module D credits were given for the avoidance of the primary production of the respective raw material and loads for the production process of new material. The substitution effects for recycling and the avoided primary raw material production are calculated in Module D, considering the output net flows for each metal. The calculated substitution potentials are 0.47 kg for steel, 0.007 kg for aluminium, and 0.03 kg for nickel.

#### Estimation and assumptions:

The datasets for the metals were adjusted to reflect the specific chemical composition of each alloy. The corresponding scrap amounts were also adapted within the datasets and are considered burden-free when entering the system boundary. For stainless steel, an average scrap content of 70% was provided by the suppliers. For aluminium alloys, a scrap share of 69.74% was adopted from the

ecoinvent dataset. For nickel alloys, the scrap content was taken from literature sources and set to 22%.

For one specific type of chromium steel, the average value of 70% could not be applied, as no suitable dataset was available, and an adjustment was not possible. Since this steel type accounts for 62% of the total mass, the overall share of secondary material used for the calculation of the results is lower than reported by the suppliers. Consequently, the results can be considered conservative.

During production, waste is generated in the form of steel scrap. Specific data for this process step were not available; only aggregated data at the factory level could be used. Consequently, the assumed waste amount is likely overestimated. This is reflected in the results, as a higher input of raw material is required.

For Primary Energy Use indicators, option A of PCR 2019:14 v.2.0.1 has been followed.

#### Cut-off rules:

The cut-off criteria follow EN15804:2012+A2:2019 and the PCR 2019:14 Construction products version 2.0.1. The product system covers a minimum of 95 % of total inflows (mass and energy) and environmental impacts per module.

Infrastructure/ capital goods are not included in the core processes. They are considered in generic datasets from the LCI-database used for upstream and downstream processes. The results of the environmental performance indicators were issued with a disclaimer.

#### Allocation:

For the impacts of recycling and energy recovery of wastes in module A3 the waste allocation procedure according to PCR 2019:14 v2.0.1 has been applied.

A physical allocation was performed taking into account the annual quantity of all produced pipe fittings in kg at the production sites in the reference year. The annual consumption of electricity and auxiliary materials at the productions site were allocated to one kg of the average product.

The manufacturing of the average product generates steel scrap as a co-product which has a commercial application in recycling. In Schlins 0.58% of the impacts are allocated to the pre-consumer scrap while 99.42% are allocated to the product system. In Mürzzuschlag 1.25% of the impacts are allocated to the pre-consumer scrap while 98.75% are allocated to the product system.

Steel leaving the product system in C3 is allocated as waste and categorized as “Material for Recycling”. To ensure consistency and avoid double counting a net scrap calculation is performed which accounts for both the input of recycled material and the output of recyclable scrap.

#### Electricity mix (A1-A3):

The electricity consumption is collected on machine level for each site and mass allocated to 1 kg of pipe fittings. The energy mix sourced from VKW is certified renewable electricity sourced to 100% in Austria. The reference year for the datasets used is 2024.

The emission factor for the GWP-GHG indicator is 0.06 kg CO<sub>2</sub> eq/kWh for the purchased electricity mix. 100% of the electricity is sourced externally.

*Electricity mix*

Type	Total share [%]
Hydro	81.15
Solar	10.24
Wind	6.94
Biomass	0.99
Renewable gas	0.68
<b>Total</b>	<b>100.00</b>

Data quality:

The EPD is based on data collected by Erne Fittings from two sites over one year from January 2024. The EPD is representative of the production of pipe fittings at the production sites in Schlins and Mürzzuschlag. The installation and end-of-life stage of the EPD covers Europe, since the pipes are mostly sold in Europe. Erne Fittings uses the same technology to produce the pipe fittings, that included in this EPD with only slight differences between the two production sites. The difference between the pipe fittings is the used raw material, ranging from alloyed steel to nickel alloys. This causes up to 265% variation in GWP-GHG in modules A1 – A3. The EPD uses background data from the ecoinvent database v3.11, 2024. No EPD data for the specific primary input materials was available. The quality of the relevant data used for the EPD in terms of its time, geography and technology representativeness using EN 15804:2012+A2:2019, Annex E, Table E.2 is mostly very good for foreground data and good for background data. The relevant data assessed included no poor or very poor data.

*Additional information on processes contributing more than 10% to the GWP-GHG results of modules A1-A3*

Process	Source Type	Source	Reference year	Data category	Share of primary data, of GWP-GHG results for A1-A3
Generation of electricity and natural gas used in manufacturing of product	EPD Owner, Database	EPD Owner, Ecoinvent v3.11	2024	Primary data, Representative secondary data	6.5%
Transport of raw materials to manufacturing site	EPD Owner, Database	EPD Owner, Ecoinvent v3.11	2024	Primary data, Representative secondary data	3.9%
Production of raw materials	EPD Owner, Database	EPD Owner, Ecoinvent v3.11	2024	Primary data, Representative secondary data	0%
Other processes	EPD Owner, Databases	EPD Owner, Ecoinvent v3.11	2024	Primary data, Representative secondary data	0%

The share of primary data is calculated based on GWP-GHG results. It is a simplified indicator for data quality that supports the use of more primary data, to increase the representativeness of and comparability between EPDs. Note that the indicator does not capture all relevant aspects of data quality and is not comparable across product categories.

Averages and variability

The variation in GWP-GHG was computed in relation to the average product. The variation in the results is related to the manufacturing site, as the energy consumption depends on the production process and as the packaging requires an additional transportation, and to the raw material used.

Modules declared, geographical scope, share of primary data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	EU	EU	AT	-	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU
Primary data used	10.4 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-29 %/+265 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	-24 %/+36 %			-	-	-	-	-	-	-	-	-	-	-	-	-	-

## ENVIRONMENTAL PERFORMANCE

### LCA results of the product(s) - main environmental performance results

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

The results of the end-of-life stage (modules C1-C4) should be considered when using the results of the product stage (modules A1-A3).

#### Mandatory impact category indicators according to EN 15804

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO <sub>2</sub> eq.	4.6E+00	ND	1.7E-01	4.0E-04	1.2E-02	2.3E-02	0.0E+00	-1.0E+00
GWP-fossil	kg CO <sub>2</sub> eq.	4.8E+00	ND	1.7E-03	4.0E-04	1.2E-02	2.2E-02	0.0E+00	-1.0E+00
GWP-biogenic	kg CO <sub>2</sub> eq.	-1.6E-01	ND	1.6E-01	4.0E-08	2.3E-06	4.8E-05	0.0E+00	-2.2E-03
GWP-luluc	kg CO <sub>2</sub> eq.	1.5E-02	ND	4.8E-07	4.1E-08	4.0E-06	2.8E-05	0.0E+00	-1.9E-03
ODP	kg CFC 11 eq.	6.1E-08	ND	2.0E-11	5.9E-12	2.5E-10	3.0E-10	0.0E+00	-7.7E-09
AP	mol H <sup>+</sup> eq.	6.2E-02	ND	1.7E-05	3.6E-06	5.3E-05	2.7E-04	0.0E+00	-3.0E-02
EP-freshwater	kg P eq.	4.8E-03	ND	6.7E-07	1.3E-08	8.2E-07	1.5E-05	0.0E+00	-1.7E-03
EP-marine	kg N eq.	5.5E-03	ND	9.2E-06	1.7E-06	2.1E-05	6.0E-05	0.0E+00	-1.7E-03
EP-terrestrial	mol N eq.	6.2E-02	ND	8.7E-05	1.8E-05	2.3E-04	6.7E-04	0.0E+00	-2.0E-02
POCP	kg NMVOC eq.	2.1E-02	ND	2.2E-05	5.4E-06	8.0E-05	2.0E-04	0.0E+00	-7.0E-03
ADP-minerals&metals*	kg Sb eq.	6.6E-04	ND	3.8E-09	1.4E-10	3.9E-08	1.6E-06	0.0E+00	-3.0E-04
ADP-fossil*	MJ	5.6E+01	ND	1.5E-02	5.2E-03	1.7E-01	3.0E-01	0.0E+00	-1.2E+01
WDP*	m <sup>3</sup>	4.3E+00	ND	3.8E-03	1.3E-05	9.2E-04	5.9E-03	0.0E+00	-1.4E+00
Acronyms	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.

The results of the impact categories abiotic depletion of minerals and metals, and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

## Additional mandatory and voluntary impact category indicators

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG <sup>1</sup>	kg CO <sub>2</sub> eq.	4.8E+00	ND	1.7E-03	4.0E-04	1.2E-02	2.3E-02	0.0E+00	-1.0E+00

As module C is included in the EPD, the use of the results of modules A1-A3, and A4-A5 is discouraged without considering the results of module C.

## Resource use indicators

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.7E+01	ND	1.4E+00	3.3E-05	2.8E-03	5.6E-02	0.0E+00	-5.3E+00
PERM	MJ	1.4E+00	ND	-1.4E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PERT	MJ	1.8E+01	ND	4.2E-04	3.3E-05	2.8E-03	5.6E-02	0.0E+00	-5.3E+00
PENRE	MJ	5.6E+01	ND	9.8E-02	5.2E-03	1.7E-01	3.0E-01	0.0E+00	-1.2E+01
PENRM	MJ	8.3E-02	ND	-8.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PENRT	MJ	5.6E+01	ND	1.5E-02	5.2E-03	1.7E-01	3.0E-01	0.0E+00	-1.2E+01
SM	kg	4.93E-01	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.07E-01
RSF	MJ	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	ND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m <sup>3</sup>	1.1E-01	ND	2.9E-05	3.3E-07	2.1E-05	1.4E-04	0.0E+00	-3.3E-02
Acronyms	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								

<sup>1</sup> This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero.

## Waste indicators

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	2.2E+00	ND	7.7E-04	5.8E-06	2.4E-04	2.0E-03	0.0E+00	-7.4E-01
Non-hazardous waste disposed	kg	3.1E+01	ND	1.0E-01	8.5E-05	5.2E-03	7.9E-02	0.0E+00	-1.2E+01
Radioactive waste disposed	kg	1.1E-04	ND	4.7E-09	5.4E-10	5.1E-08	6.7E-07	0.0E+00	-2.7E-05

## Output flow indicators

Results per functional or declared unit									
Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0.0E+00	ND	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Material for recycling	kg	0.0E+00	ND	0.0E+00	0.0E+00	0.0E+00	1.0E+00	0.0E+00	0.0E+00
Materials for energy recovery	kg	0.0E+00	ND	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Exported energy, electricity	MJ	0.0E+00	ND	1.8E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Exported energy, thermal	MJ	0.0E+00	ND	3.6E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

## Additional LCA results (other environmental performance results) of the product(s)

Variation:

The best-case result was identified as a steel with 9% chrome and 1 % molybdenum pipe fitting produced in Schlins, while the worst case product is a nickel class 1 pipe fitting produced in Mürzzuschlag. These two scenarios were used to calculate the variation in GWP-GHG in modules A1 – A3 as well as the variation in all core environmental indicators in modules A – C. Additionally, a worst case result for aluminium and a worst case result for steel was calculated to determine the variation between raw materials.

Product variation A1 – A3		
Case	GWP-GHG module A1 – A3 [kg CO <sub>2</sub> eq]	Variation compared to weighted average
Best case	3.37	-29 %
Worst case (nickel)	17.4	+265 %
Worst case (aluminium)	11.6	+143 %
Worst case (steel)	5.74	+20 %
Weighted average	4.78	-

Core environmental indicator variation A-C		
Indicator	Variation of best case compared to weighted average	Variation of worst case compared to weighted average
GWP-total	-29%	263%
GWP-fossil	-29%	262%
GWP- biogenic	-70%	641%
GWP-luluc	-28%	294%
ODP	-42%	324%
AP	-76%	2196%
EP-freshwater	-41%	204%
EP- marine	-37%	442%
EP-terrestrial	-36%	402%
POCP	-43%	813%
ADP-minerals&metals*	-28%	193%
ADP-fossil*	-36%	362%
WDP*	-62%	1548%

## ADDITIONAL ENVIRONMENTAL INFORMATION

The following conversion factors may be multiplied with the declared average results to receive more accurate results for aluminium alloy pipe fittings and nickel alloy pipe fittings respectively.

### Aluminium alloy pipe fittings

Table 1: Conversion factors for the mandatory impact categories per kg of aluminium pipe fittings

Indicator	A1-A3
GWP-total	2.04
GWP-fossil	2.00
GWP-biogenic	0.95
GWP-luluc	2.24
ODP	1.50
AP	0.98
EP-freshwater	0.71
EP-marine	1.86
EP-terrestrial	1.71

<b>POCP</b>	1.61
<b>ADP-minerals&amp; metals</b>	0.19
<b>ADP-fossil</b>	1.92
<b>WDP</b>	0.84

<b>Indicator</b>	<b>A1-A3</b>
GWP-GHG	2.01

### Nickel alloy pipe fittings

Table 2: Conversion factors for the mandatory impact categories per kg of nickel pipe fittings

<b>Indicator</b>	<b>A1-A3</b>
<b>GWP-total</b>	3.33
<b>GWP-fossil</b>	3.24
<b>GWP-biogenic</b>	0.70
<b>GWP-luluc</b>	3.75
<b>ODP</b>	3.56
<b>AP</b>	15.30
<b>EP-freshwater</b>	5.01
<b>EP-marine</b>	5.33
<b>EP-terrestrial</b>	5.43
<b>POCP</b>	7.33
<b>ADP-minerals&amp; metals</b>	7.22
<b>ADP-fossil</b>	3.92
<b>WDP</b>	11.10

<b>Indicator</b>	<b>A1-A3</b>
GWP-GHG	3.25

## ABBREVIATIONS

Abbreviation	Definition
<b>General Abbreviations</b>	
EN	European Norm (Standard)
EPD	Environmental Product Declaration
EF	Environmental Footprint
GPI	General Programme Instructions
ISO	International Organization for Standardization
LCA	Life Cycle Assessment
PCR	Product Category Rules
c-PCR	Complementary Product Category Rules
CEN	European Committee for Standardization
CLC	Co-location centre
CPC	Central product classification
GHS	Globally harmonized system of classification and labelling of chemicals
GRI	Global Reporting Initiative
<b>Environmental Impact Indicators (EN 15804)</b>	
GHG	Greenhouse gas
GWP	Global Warming Potential (kg CO <sub>2</sub> eq.)
GWP-fossil	Global Warming Potential from fossil sources (kg CO <sub>2</sub> eq.)
GWP-biogenic	Global Warming Potential from biogenic sources (kg CO <sub>2</sub> eq.)
GWP-luluc	Global Warming Potential from land use and land use change (kg CO <sub>2</sub> eq.)
GWP-total	Total Global Warming Potential (kg CO <sub>2</sub> eq.)
GWP-GHG	Global Warming Potential for greenhouse gases (kg CO <sub>2</sub> eq.)
ODP	Ozone Depletion Potential (kg CFC-11 eq.)
AP	Acidification Potential (mol H <sup>+</sup> eq.)
EP	Eutrophication Potential
EP-freshwater	Freshwater eutrophication potential (kg P eq.)
EP-marine	Marine eutrophication potential (kg N eq.)
EP-terrestrial	Terrestrial eutrophication potential (mol N eq.)
POCP	Photochemical Ozone Creation Potential (kg NMVOC eq.)
ADP	Abiotic Depletion Potential
ADP-minerals&metals	Abiotic depletion potential for non-fossil resources (kg Sb eq.)
ADP-fossil	Abiotic depletion potential for fossil resources (MJ)
WDP	Water Deprivation Potential (m <sup>3</sup> )
<b>Resource Use Indicators</b>	
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials (MJ)
PERM	Use of renewable primary energy resources used as raw materials (MJ)
PERT	Total use of renewable primary energy resources (MJ)
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (MJ)
PENRM	Use of non-renewable primary energy resources used as raw materials (MJ)
PENRT	Total use of non-renewable primary energy resources (MJ)
SM	Use of secondary material (kg)
RSF	Use of renewable secondary fuels (MJ)
NRSF	Use of non-renewable secondary fuels (MJ)
FW	Use of net fresh water (m <sup>3</sup> )
<b>Waste Indicators</b>	
HW	Hazardous Waste (disposed) (kg)
NHW	Non-Hazardous Waste (disposed) (kg)
RW	Radioactive Waste (disposed) (kg)
<b>Output Flow Indicators</b>	
CFR	Components for Reuse (kg)

MR	Material for Recycling (kg)
MER	Materials for Energy Recovery (kg)
EEE	Exported Energy, Electricity (MJ)
EET	Exported Energy, Thermal (MJ)
<b>Lifecycle Stages / Modules</b>	
A1	Raw material supply
A2	Transport
A3	Manufacturing
A4	Transport to site
A5	Construction/Installation
B1	Use
B2	Maintenance
B3	Repair
B4	Replacement
B5	Refurbishment
B6	Operational energy use
B7	Operational water use
C1	Deconstruction/Demolition
C2	Transport to waste processing
C3	Waste processing
C4	Disposal
D	Reuse-Recovery-Recycling potential
<b>Other Relevant Terms</b>	
SVHC	Substances of Very High Concern
EC No.	European Community Number
CAS No.	Chemical Abstracts Service Number
MJ	Megajoule
kg	Kilogram
m <sup>3</sup>	Cubic Meter
NMVOG	Non-Methane Volatile Organic Compounds
Sb eq.	Antimony Equivalents
P eq.	Phosphorus Equivalents
N eq.	Nitrogen Equivalents
CFC-11 eq.	Chlorofluorocarbon-11 Equivalents
CO <sub>2</sub> eq.	Carbon Dioxide Equivalents
kg C	Kilograms of Carbon
kg CO <sub>2</sub> eq.	Kilograms of Carbon Dioxide Equivalent
ND	Not Declared

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## VERSION HISTORY

Original Version of the EPD, 2025-12-10

