



Environmental Product Declaration (EPD)

EPD 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

Qmax with Ductile Iron/Galvanised Steel Edge Rail

Programme: “National programme of environmental labelling“ - CZ
EPD Database in the Czech Republic - Ekoznačka.cz

Programme operator: Ministry of the Environment of the Czech Republic

Declaration number: EPD-NPEZ-B612011

EPD owner: ACO Industries Tábor s.r.o.

Author: Envitrail s.r.o.

Publication date: 29-05-2026

Valid until: 28-05-2031

Envitrail



General information

Programme information

Accountabilities for PCR, LCA and independent, third-party verification:

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Life Cycle Assessment (LCA)

LCA accountability: Mgr. Kateřina Lorencová. EnviTrail s.r.o., lorencova@envitrail.com, Ing. Miroslava Česká, <https://envitrail.com/>

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006. via:

EPD verification by individual verifier

Third-party verifier: Jan Weinzettel. Ph.D., weinzettel@seznam.cz

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

Yes No

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

Statement on the requirements for comparability of EPDs. adapted from ISO 14025:

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same 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 equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

EPD owner: ACO Industries Tábor s.r.o.

Průmyslová 1158, 391 01 Sezimovo Ústí, Czech Republic

Contact:

Klára Kalinová, email: kkalinova@aco.cz, +420 737 263 251

Description of the organisation:

ACO Industries Tábor s.r.o. is part of the ACO Group headquartered in Rendsburg/Büdelndorf, Germany, which has been a family-owned business since its foundation in 1946. The group employs more than 5,400 people in production and sales units worldwide.

ACO Group specialises in the development and production of drainage technologies and water treatment solutions.

ACO Industries Tábor s.r.o. serves as the Competence Center for wastewater treatment technologies, primarily stormwater runoff, but also wastewater containing FOG (fat-oil-grease) and light liquids. The purpose of these technologies is to treat water to a quality that allows its safe return to the natural environment through infiltration, retention (e.g. in fire tanks or retention ponds), discharge into watercourses, or reuse (e.g. for irrigation or toilet flushing).

Production is carried out using several technologies, including plastic rotational moulding, polyethylene welding, and fiberglass winding. The portfolio is developed and manufactured in accordance with European and international standards and is subject to testing by accredited European institutes.

More at: www.discover.aco, www.aco.com

Product-related or management system-related certifications:

The quality of products is ensured by an effective quality management system in accordance with EN ISO 9001 and complies with the technical regulations related to the product type.

A Declaration of Performance (DoP) is issued for all products in the ACO Top Sections range in accordance with EU Regulation No. 2024/3110 (CPR), with performance assessed in accordance with EN 1433.

Product information

Product name: Qmax with Ductile Iron/Galvanised Steel Edge Rail

(Qmax 150 - Type: Q-Guard, Q-Flow; Qmax 225 - Type: Q-Guard, Q-Flow; Qmax 350 - Type: Q-Guard, Q-Flow; Qmax 550 - Type: Q-Guard, Q-Flow; Qmax 700 - Type: Q-Guard, Q-Flow; Qmax 900 - Type: Q-Guard, Q-Flow; Qmax 150 - Type: Q-Guard, Q-Flow; Qmax 150 - Type: Q-Slot; Qmax 225 - Type: Q-Slot; Qmax 225 - Type: Q-Guard, Q-Flow; Qmax 350 - Type: Q-Guard, Q-Flow; Qmax 350 - Type: Q-Slot; Qmax 550 - Type: Q-Guard, Q-Flow; Qmax 550 - Type: Q-Slot; Qmax 700 - Type: Q-Guard, Q-Flow; Qmax 700 - Type: Q-Slot; Qmax 900 - Type: Q-Guard, Q-Flow; Qmax 900 - Type: Q-Slot)

The selection of average products was based on raw material consumption over a one-year period (2024). Based on the material variants of the edge rails, two Qmax product groups were defined (with galvanized steel and ductile iron). For each variant, two products were subsequently selected within the material distribution range based on the variability of the results, aiming to cover the entire Qmax product line and ensure that the results deviation is less than 10% to minimise variability.

Table 1: Product groups, average products and included product variants

Product group	Average product	Included products
Qmax - ductile iron I	57.5% metal: 42.5% plastic	Qmax 150 - Type: Q-Guard, Q-Flow Qmax 225 - Type: Q-Guard, Q-Flow
Qmax - ductile iron II	42.5% metal: 57.5% plastic	Qmax 350 - Type: Q-Guard, Q-Flow Qmax 550 - Type: Q-Guard, Q-Flow Qmax 700 - Type: Q-Guard, Q-Flow Qmax 900 - Type: Q-Guard, Q-Flow
Qmax - galvanised steel I	56% metal: 44% plastic	Qmax 150 - Type: Q-Guard, Q-Flow Qmax 150 - Type: Q-Slot Qmax 225 - Type: Q-Slot
Qmax - galvanised steel II	44% metal: 56% plastic	Qmax 225 - Type: Q-Guard, Q-Flow Qmax 350 - Type: Q-Guard, Q-Flow Qmax 350 - Type: Q-Slot Qmax 550 - Type: Q-Guard, Q-Flow Qmax 550 - Type: Q-Slot Qmax 700 - Type: Q-Guard, Q-Flow Qmax 700 - Type: Q-Slot Qmax 900 - Type: Q-Guard, Q-Flow Qmax 900 - Type: Q-Slot

Product description:

ACO Qmax® is a high-capacity slot drainage system manufactured from rotationally moulded polyethylene. It has metal (ductile iron or galvanised steel) edge rails to protect the channel from vehicle movements. Designed for sustainable urban drainage (SuDS) and high-traffic applications. Qmax provides combined surface water conveyance and attenuation in a robust, lightweight unit.

Name and location of production site:

ACO Industries Tábor s.r.o., Průmyslová 1158, 391 01 Sezimovo Ústí, Czech Republic

Manufacture process:

The plastic powder is melted at 250 degrees in a rotating mould, where it gradually spreads over the inner surface until the product is formed. Controlled cooling follows. In the next step, mechanical adjustments are made, edge rails are installed, and seals are added.

LCA information

Declared unit for average product based on mass: 1 kg of the average product of the high-capacity slot drainage system Qmax

Reference service life:

The reference service life of the average product is assumed to be 50 years.

Time representativeness:

Specific production data represent specific values of a product group for the period from January 2024 to December 2024. Generic and background data are based on the ecoinvent 3.11 cut-off database.

Geographical representativeness:

The geographical scope of the study focuses on the Czech Republic, with priority given to national and European processes.

Database(s) and LCA software used:

OpenLCA ver. 2.4 software, database ecoinvent version 3.11, cutoff.

Methodology LCIA:

Environmental Footprint 3.1. EN 15804 [8]

Cutoff:

All inputs and outputs of unit processes are included in the calculation. Environmental impacts related to infrastructure and capital goods are not considered, except for processes included in selected datasets in the database.

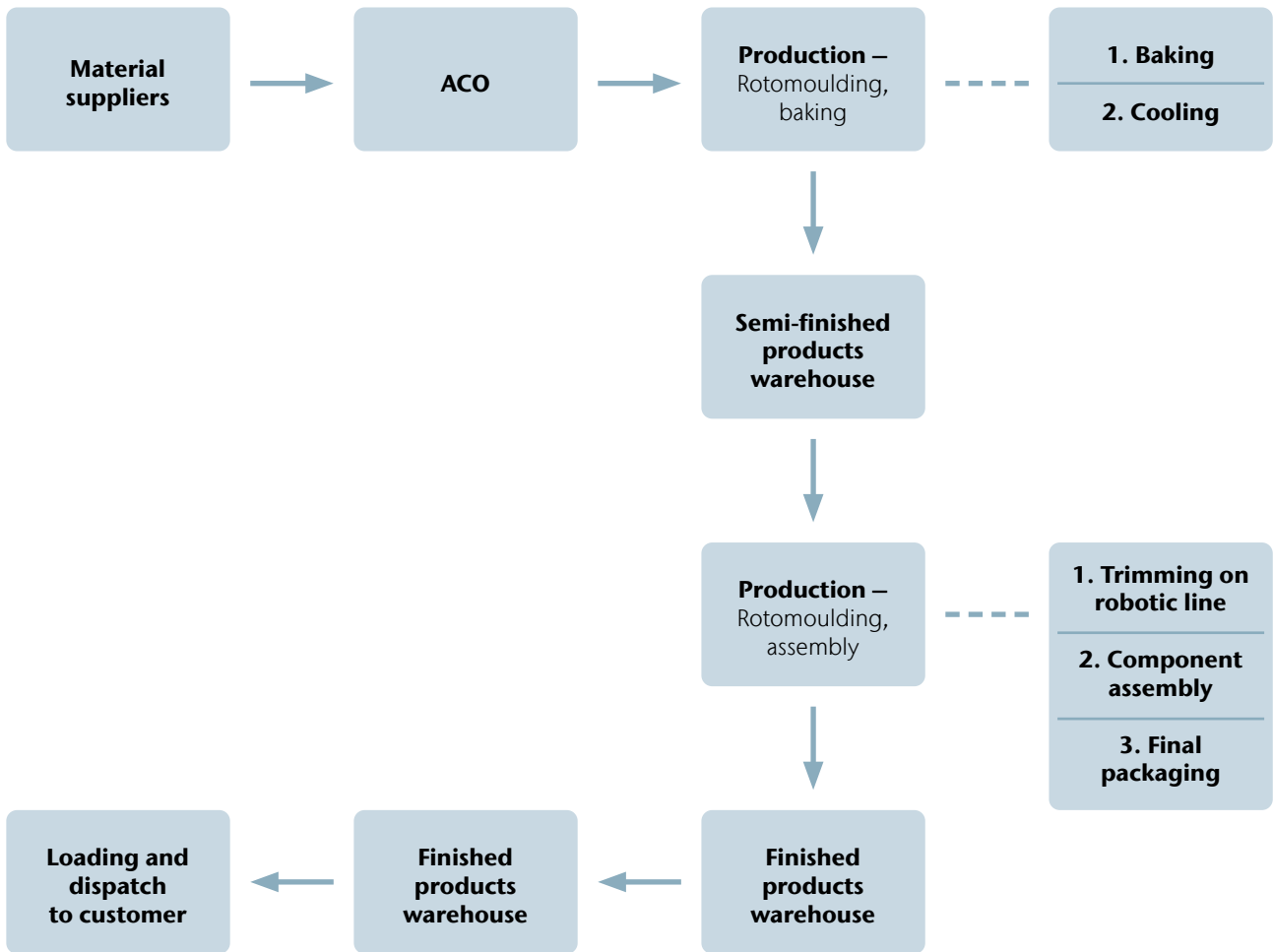
Allocation:

For input materials, energy consumption, and output flows, mass allocation was performed from annual data on total production per declared unit. The ecoinvent database system model for secondary flow allocation uses the selected “polluter pays principle” (PPP).

Manufacturing parameters (electricity consumption, heat consumption, and production of plastic waste) were allocated based on the total annual production of plastic parts for Qmax products (231 t), as these processes are associated with the production of plastic components.

Description of system boundary:

Cradle-to-gate (A1-A3) with options, modules C1-C4 and module D.



Declared modules:

Construction works assessment information																
Construction works life cycle information																Supplementary information beyond construction works life cycle
A1-A3			A4-A5		B1-B7							C1-C4				D
Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacturing	Transport	Construction and installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operation energy use	Operation water use	Deconstruction & demolition	Transport	Waste processing	Disposal	Reuse, recovery, recycling potential
x	x	x	ND	ND	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x

*ND = Not Declared, used for voluntary parameters that are not quantified because of a lack of data.

X = included module

The product stage includes the following modules:

- **A1 (Raw material supply)** – Specific data for a slot drainage system Qmax were collected by ACO Industries Tábor s.r.o. and were used for the material distribution. Generic data were applied to the production and supply chain of these materials. This module also includes the primary packaging of input materials. Detailed information is shown in Table 2.
- **A2 (Transport)** – Module A2 includes the transport of raw materials to the production site. Materials are transported by lorry 7.5-16 t and LCV (Light Commercial Vehicle). In the case of Qmax with ductile iron edge rails, some raw materials are transported by a sea container ship.
- **A3 (Manufacturing)** – This module includes the manufacture of products, auxiliary materials, and packaging. The processing of any waste arising from this stage is also included. The module includes the waste processing of primary packaging material.

The specific electricity mix (high voltage) for the production site of ACO Industries, Tábor s.r.o., was used (based on the supplier's invoice and ERÚ background data) [9], with an emission factor of 0.625 kg CO₂-eq/kWh. The electric mix comprises 53.60% fossil (47.5% lignite, 5.86% natural gas), 40.95% nuclear, and 5.58% renewable sources.

The end-of-life (EoL) stage includes modules:

The EoL phase is a scenario, based on an assumed reference service life of 50 years; a disposal for this product group has not yet occurred (2026).

- **C1 (Deconstruction & demolition)** – The Qmax slot drainage system is removed using mechanical labour with an excavator. The excavation volume was determined based on the largest product within each product group. For calculation purposes, the product with the largest dimensions within the representative product group was selected (e.g., for Qmax – galvanised iron II, the largest product considered was Qmax 900, Type: Q-Guard / Q-Flow). This conservative approach was applied to avoid underestimating the environmental impacts associated with excavation activities.
- **C2 (Transport)** – This module describes the transportation of waste to the waste treatment site. The average freight transportation distance for the inert materials is 77 km [6].
- **C3 (Waste treatment)** – The expected amount of the product sent to recycling is zero.
- **C4 (Disposal)** – Based on the product's location during the use phase and the material's character, a conservative assumption of inert material landfilling was selected.

The benefits and loads beyond the system boundary– Module D:

The potential benefits and loads of waste utilisation are assessed in information Module D. Recyclable waste from Module A3 is used for the calculation of potential benefits (i.e. avoiding the production of primary materials).

Submodule D1 calculates the benefits of using waste as a secondary raw material instead of a primary raw material. This module was calculated from the cardboard and plastic waste (in the case of Qmax, with galvanised steel, also metal waste) from module A3.

For metal, cardboard and plastics, the change in quality is determined by the ratio between primary and secondary materials based on the economic ratio specified in the ecoinvent 3.11 database [6]. The recycling of cardboard packaging can prevent the production of 0.0003 kg of cardboard boxes. The benefits of recycling plastic packaging can prevent the production of 0.0076 kg of polyethylene granulate for Qmax with ductile iron edge rails and 0.0078 kg of Qmax with galvanised steel edge rails. The benefits of recycling metal packaging (steel straps) will prevent the production of 0.0024 kg of pig iron.

Modules that were not included (not declared):

- **A4-A5 (Construction process stage)** – Not declared.
- **B1-B7 (Use stage)** – Not declared due to the various possibilities of use, depending on consumer behaviour.

Content information

Table 2: Material distribution in the average products of the system Qmax

Material distribution	Qmax-ductile iron I Amount [%]	Qmax-ductile iron II Amount [%]	Qmax-galvanised steel I Amount [%]	Qmax-galvanised steel II Amount [%]	Origin
Plastic powder	37.3%	51.4%	38.6%	50.0%	Czech Republic
Plastic powder recycled	2.49%	3.34%	2.75%	3.34%	Czech Republic
Synthetic rubber		2.67%			The United Kingdom
Galvanised steel compounds	7.32%		1.46%		Czech Republic, Ukraine
Ductile iron edge rails	50.2%	35.2%	0%		China
Galvanised edge rails	0%		54.6%	42.5%	Ukraine
Other materials	0.1%		<0.1%		Czech Republic

Substances listed as substances of very high concern (SVHC substances), subject to authorisation by the European Chemicals Agency, are not contained in the product in declarable quantities.

Biogenic carbon content

The calculation of biogenic carbon content and conversion to carbon dioxide is performed in accordance with EN 16449 [5] and based on the distribution of organic components per declared unit of the final product. The resulting biogenic carbon content for the average products Qmax and the packaging material is shown in Table 3.

Table 3: Biogenic carbon content

Biogenic carbon content	kg C/1 kg Qmax-ductile iron I	kg C/1 kg Qmax-ductile iron II	kg C/1 kg Qmax-galvanised steel I	kg C/1 kg Qmax-galvanised steel II
Biogenic carbon content in the product	0	0	0	0
Biogenic carbon content in packaging materials	0	0	0	0

Note: 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

Based on the characteristics of the material and the thermal processing of the plastic, zero organic carbon is assumed. No packaging material is associated with the final product.

Qmax – ductile iron I

(includes products: Qmax 150 - Type: Q-Guard, Q-Flow; Qmax 225 - Type: Q-Guard, Q-Flow)

Material distribution: 57.5% metal: 42.5 % plastic

(Material distribution range: 65% metal: 35% plastic – 50% metal: 50% plastic)



Results of the environmental performance indicators

Table 4: Core environmental impact indicators according to EN 15804 (EF 3.1)

Indicator	Reference unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
AP	mol H ⁺ -Eq	1.47E-02	ND	ND	1.70E-04	2.59E-05	0	1.10E-04	-6.81E-05
GWP-total	kg CO ₂ -Eq	3.82E+00	ND	ND	1.94E-02	1.15E-02	0	9.79E-03	-2.55E-02
GWP-fossil	kg CO ₂ -Eq	3.85E+00	ND	ND	1.94E-02	1.15E-02	0	9.74E-03	-2.60E-02
GWP-biogenic	kg CO ₂ -Eq	9.64E-03	ND	ND	6.61E-06	7.15E-06	0	4.65E-05	4.64E-04
GWP-luluc	kg CO ₂ -Eq	1.05E-02	ND	ND	2.18E-06	4.07E-06	0	2.45E-06	-1.13E-05
ADP-fossil*	MJ, net calorific value	9.60E+00	ND	ND	1.46E-02	2.23E-02	0	1.41E-01	-3.79E-02
EP-fw	kg P-Eq	7.11E+01	ND	ND	2.51E-01	1.68E-01	0	2.30E-01	-9.44E-01
EP-marine	kg N-Eq	9.69E-04	ND	ND	9.03E-07	8.31E-07	0	1.68E-05	-3.31E-06
EP-terrestrial	mol N-Eq	3.82E-03	ND	ND	7.84E-05	6.42E-06	0	2.74E-05	-1.40E-05
ADP-elements*	kg Sb-Eq	3.96E-02	ND	ND	8.57E-04	6.94E-05	0	2.95E-04	-1.51E-04
ODP	kg CFC-11-Eq	4.51E-09	ND	ND	2.60E-12	1.93E-12	0	3.93E-12	-3.35E-12
POCP	kg NMVOC-Eq	1.98E-08	ND	ND	3.73E-11	1.05E-10	0	2.46E-10	-1.34E-10
WDP*	m ³ world eq. deprived	2.14E-01	ND	ND	1.71E-04	2.11E-04	0	2.91E-04	-1.29E-03

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-elements = 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.

General disclaimer: 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. It is not recommended to use the results of modules A1-A3 without taking into account the results of module C.

Additional mandatory and voluntary impact category indicators:

Table 5: Additional mandatory and voluntary impact category indicators according to EN 15804 (EF 3.1)

Qmax									
Indicator	Reference unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
Global warming potential (GWP-GHG)	kg CO ₂ -Eq	3.85E+00	ND	ND	1.94E-02	1.15E-02	0	9.76E-03	-2.60E-02

GWP-GHG: 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 CO₂ is set to zero.

Resource use indicators:

Table 6: Resource use parameters for Qmax- ductile iron I

Parameter	Unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ	2.43E-01	ND	ND	0	2.80E-03	0	0	0
PERM	MJ	1.09E+00	ND	ND	0	0	0	4.40E-03	-1.84E-02
PERT	MJ	1.33E+00	ND	ND	2.40E-03	2.83E-03	0	4.43E-03	-1.84E-02
PENRE	MJ	2.45E+01	ND	ND	0	1.68E-01	0	0	0
PENRM	MJ	2.73E+01	ND	ND	0	0	0	2.30E-01	-9.44E-01
PENRT	MJ	5.18E+01	ND	ND	2.51E-01	1.68E-01	0	2.30E-01	-9.44E-01
SM	kg	2.49E-02	ND	ND	0	0	0	0	0
RSF	MJ	0	ND	ND	0	0	0	0	0
NRSF	MJ	0	ND	ND	0	0	0	0	0
FW	m ³	8.13E-03	ND	ND	1.71E-05	2.16E-05	0	0	-1.52E-04

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

Waste indicators

Table 7: Waste indicators for Qmax- ductile iron I

Parameter	Unit	A1-A3	A4-15	B1-B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1.11E-01	ND	ND	3.44E-04	1.73E-04	0	2.71E-04	-1.13E-04
Non-hazardous waste disposed	kg	9.81E+00	ND	ND	2.78E-03	1.81E-03	0	3.25E+00	-2.50E-01
Radioactive waste disposed	kg	6.18E-05	ND	ND	4.22E-08	5.22E-08	0	7.00E-08	-3.25E-07

Output flow indicators

Table 8: Output flow indicators for Qmax- ductile iron I

Indicator	Unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
Components for re-use	kg	0	ND	ND	0	0	0	0	0
Material for recycling	kg	1.15E-02	ND	ND	0	0	0	0	0
Materials for energy recovery	kg	0	ND	ND	0	0	0	0	0
Exported energy, electricity	MJ	0	ND	ND	0	0	0	0	0
Exported energy, thermal	MJ	0	ND	ND	0	0	0	0	0

Qmax – ductile iron II

(includes products: Qmax 350 - Type: Q-Guard, Q-Flow; Qmax 550 - Type: Q-Guard, Q-Flow; Qmax 700 - Type: Q-Guard, Q-Flow; Qmax 900 - Type: Q-Guard, Q-Flow)

Material distribution: 42.5% metal: 57.5% plastic

(Material distribution range: 50% metal: 50% plastic – 35% metal: 65% plastic)



Results of the environmental performance indicators

Table 9: Core environmental impact indicators according to EN 15804 (EF 3.1)

Indicator	Reference unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
AP	mol H ⁺ -Eq	1.55E-02	ND	ND	1.70E-04	2.59E-05	0	1.10E-04	-6.81E-05
GWP-total	kg CO ₂ -Eq	3.99E+00	ND	ND	1.94E-02	1.15E-02	0	9.79E-03	-2.55E-02
GWP-fossil	kg CO ₂ -Eq	4.00E+00	ND	ND	1.94E-02	1.15E-02	0	9.74E-03	-2.60E-02
GWP-biogenic	kg CO ₂ -Eq	1.13E-02	ND	ND	6.61E-06	7.15E-06	0	4.65E-05	4.64E-04
GWP-luluc	kg CO ₂ -Eq	7.97E-03	ND	ND	2.18E-06	4.07E-06	0	2.45E-06	-1.13E-05
ADP-fossil*	MJ, net calorific value	1.10E+01	ND	ND	1.46E-02	2.23E-02	0	1.41E-01	-3.79E-02
EP-fw	kg P-Eq	8.03E+01	ND	ND	2.51E-01	1.68E-01	0	2.30E-01	-9.44E-01
EP-marine	kg N-Eq	9.64E-04	ND	ND	9.03E-07	8.31E-07	0	1.68E-05	-3.31E-06
EP-terrestrial	mol N-Eq	3.98E-03	ND	ND	7.84E-05	6.42E-06	0	2.74E-05	-1.40E-05
ADP-elements*	kg Sb-Eq	4.15E-02	ND	ND	8.57E-04	6.94E-05	0	2.95E-04	-1.51E-04
ODP	kg CFC-11-Eq	5.95E-09	ND	ND	2.60E-12	1.93E-12	0	3.93E-12	-3.35E-12
POCP	kg NMVOC-Eq	2.32E-08	ND	ND	3.73E-11	1.05E-10	0	2.46E-10	-1.34E-10
WDP*	m ³ world eq. deprived	2.43E-01	ND	ND	1.71E-04	2.11E-04	0	2.91E-04	-1.29E-03

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-elements = 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.

General disclaimer: 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. It is not recommended to use the results of modules A1-A3 without taking into account the results of module C.

Additional mandatory and voluntary impact category indicators:

Table 10: Additional mandatory and voluntary impact category indicators according to EN 15804 (EF 3.1)

Qmax - ductile iron II									
Indicator	Reference unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
Global warming potential (GWP-GHG)	kg CO ₂ eq	4.00E+00	ND	ND	1.94E-02	1.15E-02	0	9.76E-03	-2.60E-02

GWP-GHG: 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 CO₂ is set to zero.

Resource use indicators:

Table 11: Resource use parameters for Qmax- ductile iron II

Parameter	Unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ	1.62E-01	ND	ND	0	2.80E-03	0	0	0
PERM	MJ	1.90E+00	ND	ND	0	0	0	4.40E-03	-1.84E-02
PERT	MJ	2.06E+00	ND	ND	2.40E-03	2.83E-03	0	4.43E-03	-1.84E-02
PENRE	MJ	1.47E+01	ND	ND	0	1.68E-01	0	0	0
PENRM	MJ	5.20E+01	ND	ND	0	0	0	2.30E-01	-9.44E-01
PENRT	MJ	6.67E+01	ND	ND	2.51E-01	1.68E-01	0	2.30E-01	-9.44E-01
SM	kg	3.43E-02	ND	ND	0	0	0	0	0
RSF	MJ	0	ND	ND	0	0	0	0	0
NRSF	MJ	0	ND	ND	0	0	0	0	0
FW	m ³	1.19E-02	ND	ND	1.71E-05	2.16E-05	0	0	-2.00E-04

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

Waste indicators

Table 12: Waste indicators for Qmax- ductile iron II

Parameter	Unit	A1-A3	A4-15	B1-B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1.20E-01	ND	ND	3.44E-04	1.73E-04	0	2.71E-04	-7.50E-05
Non-hazardous waste disposed	kg	1.27E+01	ND	ND	2.78E-03	1.81E-03	0	3.25E+00	-1.46E-01
Radioactive waste disposed	kg	6.68E-05	ND	ND	4.22E-08	5.22E-08	0	7.00E-08	-2.03E-07

Output flow indicators

Table 13: Output flow indicators for Qmax- ductile iron II

Indicator	Unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
Components for re-use	kg	0	ND	ND	0	0	0	0	0
Material for recycling	kg	1.15E-02	ND	ND	0	0	0	0	0
Materials for energy recovery	kg	0	ND	ND	0	0	0	0	0
Exported energy, electricity	MJ	0	ND	ND	0	0	0	0	0
Exported energy, thermal	MJ	0	ND	ND	0	0	0	0	0

Qmax – galvanised steel I

(includes products: Qmax 150 - Type: Q-Guard, Q-Flow; Qmax 150 - Type: Q-Slot; Qmax 225 - Type: Q-Slot)

Material distribution: 56% metal: 44% plastic

(Material distribution range: 65% metal: 35% plastic – 50% metal: 50% plastic)



Results of the environmental performance indicators

Table 14: Core environmental impact indicators according to EN 15804 (EF 3.1)

Indicator	Reference unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
AP	mol H ⁺ -Eq	1.72E-02	ND	ND	6.26E-05	2.59E-05	0	1.10E-04	-8.11E-05
GWP-total	kg CO ₂ -Eq	5.02E+00	ND	ND	7.15E-03	1.15E-02	0	9.79E-03	-2.94E-02
GWP-fossil	kg CO ₂ -Eq	4.96E+00	ND	ND	7.15E-03	1.15E-02	0	9.74E-03	-2.98E-02
GWP-biogenic	kg CO ₂ -Eq	6.21E-02	ND	ND	2.44E-06	7.15E-06	0	4.65E-05	4.70E-04
GWP-luluc	kg CO ₂ -Eq	3.13E-03	ND	ND	8.05E-07	4.07E-06	0	2.45E-06	-1.20E-05
ADP-fossil*	MJ, net calorific value	3.73E+01	ND	ND	5.37E-03	2.23E-02	0	1.41E-01	-4.79E-02
EP-fw	kg P-Eq	8.73E+01	ND	ND	9.27E-02	1.68E-01	0	2.30E-01	-9.79E-01
EP-marine	kg N-Eq	1.82E-03	ND	ND	3.33E-07	8.31E-07	0	1.68E-05	-4.88E-06
EP-terrestrial	mol N-Eq	4.43E-03	ND	ND	2.89E-05	6.42E-06	0	2.74E-05	-1.71E-05
ADP-elements*	kg Sb-Eq	4.41E-02	ND	ND	3.16E-04	6.94E-05	0	2.95E-04	-1.84E-04
ODP	kg CFC-11-Eq	7.15E-09	ND	ND	9.57E-13	1.93E-12	0	3.93E-12	-8.57E-12
POCP	kg NMVOC-Eq	6.29E-08	ND	ND	1.37E-11	1.05E-10	0	2.46E-10	-1.38E-10
WDP*	m ³ world eq. deprived	4.18E-01	ND	ND	6.30E-05	2.11E-04	0	2.91E-04	-1.31E-03

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-elements = 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.

General disclaimer: 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. It is not recommended to use the results of modules A1-A3 without taking into account the results of module C.

Additional mandatory and voluntary impact category indicators:

Table 15: Additional mandatory and voluntary impact category indicators according to EN 15804 (EF 3.1)

Qmax - ductile iron II									
Indicator	Reference unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
Global warming potential (GWP-GHG)	kg CO ₂ eq	4.98E+00	ND	ND	7.15E-03	1.15E-02	0	9.76E-03	-2.98E-02

GWP-GHG: 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 CO₂ is set to zero.

Resource use indicators:

Table 16: Resource use parameters for Qmax- galvanised steel I

Parameter	Unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ	2.63E-01	ND	ND	0	2.80E-03	0	0	0
PERM	MJ	5.33E+00	ND	ND	0	0	0	4.40E-03	-1.90E-02
PERT	MJ	5.60E+00	ND	ND	8.84E-04	2.83E-03	0	4.43E-03	-1.90E-02
PENRE	MJ	2.51E+01	ND	ND	0	1.68E-01	0	0	0
PENRM	MJ	6.22E+01	ND	ND	0	0	0	2.30E-01	-9.79E-01
PENRT	MJ	8.73E+01	ND	ND	9.27E-02	1.68E-01	0	2.30E-01	-9.79E-01
SM	kg	2.75E-02	ND	ND	0	0	0	0	0
RSF	MJ	0	ND	ND	0	0	0	0	0
NRSF	MJ	0	ND	ND	0	0	0	0	0
FW	m ³	2.41E-02	ND	ND	6.30E-06	2.16E-05	0	0	-1.58E-04

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

Waste indicators

Table 17: Waste indicators for Qmax- galvanised steel I

Parameter	Unit	A1-A3	A4-15	B1-B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	5.80E-01	ND	ND	1.27E-04	1.73E-04	0	2.71E-04	-1.69E-04
Non-hazardous waste disposed	kg	1.94E+01	ND	ND	1.03E-03	1.81E-03	0	3.25E+00	-2.49E-01
Radioactive waste disposed	kg	1.05E-04	ND	ND	1.56E-08	5.22E-08	0	7.00E-08	-3.30E-07

Output flow indicators

Table 18: Output flow indicators for Qmax- galvanised steel I

Indicator	Unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
Components for re-use	kg	0	ND	ND	0	0	0	0	0
Material for recycling	kg	1.52E-02	ND	ND	0	0	0	0	0
Materials for energy recovery	kg	0	ND	ND	0	0	0	0	0
Exported energy, electricity	MJ	0	ND	ND	0	0	0	0	0
Exported energy, thermal	MJ	0	ND	ND	0	0	0	0	0

Qmax – galvanised steel II

(includes products: Qmax 225 - Type: Q-Guard, Q-Flow; Qmax 350 - Type: Q-Guard, Q-Flow; Qmax 350 - Type: Q-Slot; Qmax 550 - Type: Q-Guard, Q-Flow; Qmax 550 - Type: Q-Slot; Qmax 700 - Type: Q-Guard, Q-Flow; Qmax 700 - Type: Q-Slot; Qmax 900 - Type: Q-Guard, Q-Flow; Qmax 900 - Type: Q-Slot)

Material distribution: 44% metal: 56% plastic

(Material distribution range: 50% metal: 50% plastic – 35% metal: 65% plastic)



Results of the environmental performance indicators

Table 19: Core environmental impact indicators according to EN 15804 (EF 3.1)

Indicator	Reference unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
AP	mol H ⁺ -Eq	1.59E-02	ND	ND	1.81E-04	2.59E-05	0	1.10E-04	-8.11E-05
GWP-total	kg CO ₂ -Eq	4.79E+00	ND	ND	2.06E-02	1.15E-02	0	9.79E-03	-2.94E-02
GWP-fossil	kg CO ₂ -Eq	4.73E+00	ND	ND	2.06E-02	1.15E-02	0	9.74E-03	-2.98E-02
GWP-biogenic	kg CO ₂ -Eq	5.05E-02	ND	ND	7.03E-06	7.15E-06	0	4.65E-05	4.70E-04
GWP-luluc	kg CO ₂ -Eq	2.81E-03	ND	ND	2.32E-06	4.07E-06	0	2.45E-06	-1.20E-05
ADP-fossil*	MJ, net calorific value	3.15E+01	ND	ND	1.55E-02	2.23E-02	0	1.41E-01	-4.79E-02
EP-fw	kg P-Eq	8.98E+01	ND	ND	2.67E-01	1.68E-01	0	2.30E-01	-9.79E-01
EP-marine	kg N-Eq	1.61E-03	ND	ND	9.60E-07	8.31E-07	0	1.68E-05	-4.88E-06
EP-terrestrial	mol N-Eq	4.09E-03	ND	ND	8.33E-05	6.42E-06	0	2.74E-05	-1.71E-05
ADP-elements*	kg Sb-Eq	4.09E-02	ND	ND	9.12E-04	6.94E-05	0	2.95E-04	-1.84E-04
ODP	kg CFC-11-Eq	7.67E-09	ND	ND	2.76E-12	1.93E-12	0	3.93E-12	-8.57E-12
POCP	kg NMVOC-Eq	5.48E-08	ND	ND	3.96E-11	1.05E-10	0	2.46E-10	-1.38E-10
WDP*	m ³ world eq. deprived	3.92E-01	ND	ND	1.82E-04	2.11E-04	0	2.91E-04	-1.31E-03

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-elements = 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.

General disclaimer: 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. It is not recommended to use the results of modules A1-A3 without taking into account the results of module C.

Additional mandatory and voluntary impact category indicators:

Table 20: Additional mandatory and voluntary impact category indicators according to EN 15804 (EF 3.1)

Qmax									
Indicator	Reference unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
Global warming potential (GWP-GHG)	kg CO ₂ -Eq	4.75E+00	ND	ND	2.06E-02	1.15E-02	0	9.76E-03	-2.98E-02

GWP-GHG: 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 CO₂ is set to zero.

Resource use indicators:

Table 21: Resource use parameters for Qmax- galvanised steel II

Parameter	Unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
PERE	MJ	2.53E-01	ND	ND	0	2.80E-03	0	0	0
PERM	MJ	4.84E+00	ND	ND	0	0	0	4.40E-03	-1.90E-02
PERT	MJ	5.10E+00	ND	ND	2.55E-03	2.83E-03	0	4.43E-03	-1.90E-02
PENRE	MJ	2.45E+01	ND	ND	0	1.68E-01	0	0	0
PENRM	MJ	6.52E+01	ND	ND	0	0	0	2.30E-01	-9.79E-01
PENRT	MJ	8.98E+01	ND	ND	2.67E-01	1.68E-01	0	2.30E-01	-9.79E-01
SM	kg	3.51E-02	ND	ND	0	0	0	0	0
RSF	MJ	0	ND	ND	0	0	0	0	0
NRSF	MJ	0	ND	ND	0	0	0	0	0
FW	m ³	2.31E-02	ND	ND	1.82E-05	2.16E-05	0	0	-1.58E-04

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

Waste indicators

Table 22: Waste indicators for Qmax- galvanised steel II

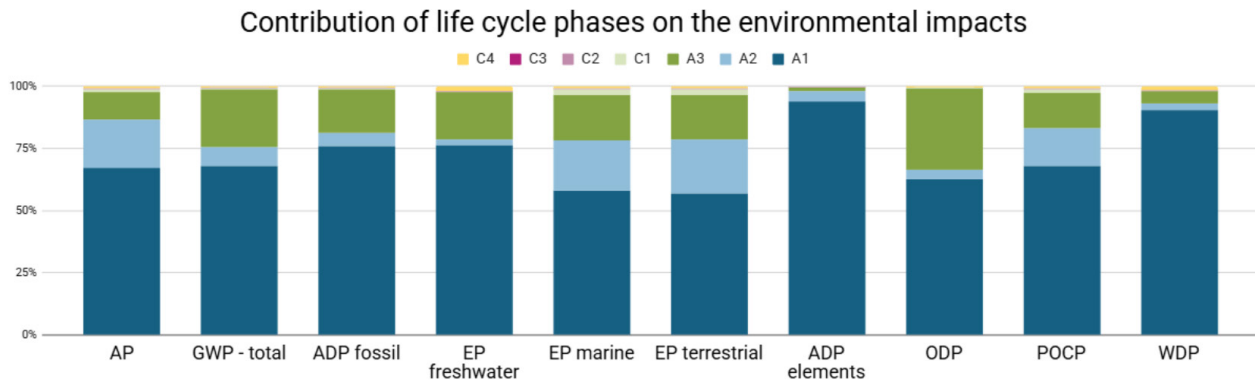
Parameter	Unit	A1-A3	A4-15	B1-B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	4.72E-01	ND	ND	3.66E-04	1.73E-04	0	2.71E-04	-1.69E-04
Non-hazardous waste disposed	kg	1.94E+01	ND	ND	2.96E-03	1.81E-03	0	3.25E+00	-2.49E-01
Radioactive waste disposed	kg	9.84E-05	ND	ND	4.49E-08	5.22E-08	0	7.00E-08	-3.30E-07

Output flow indicators

Table 23: Output flow indicators for Qmax- galvanised steel II

Indicator	Unit	A1-A3	A4-A5	B1-B7	C1	C2	C3	C4	D
Components for re-use	kg	0	ND	ND	0	0	0	0	0
Material for recycling	kg	1.52E-02	ND	ND	0	0	0	0	0
Materials for energy recovery	kg	0	ND	ND	0	0	0	0	0
Exported energy, electricity	MJ	0	ND	ND	0	0	0	0	0
Exported energy, thermal	MJ	0	ND	ND	0	0	0	0	0

LCA Interpretation



Graph 1: Contribution of life cycle phases on the environmental impacts – Qmax- ductile iron I

Based on normalised and weighted results according to the EF ver. 3.1, the three most relevant impact categories (hotspots) are Climate Change, Energy resources: fossil fuels (ADP-fossil) and Material resources: metals/minerals (ADP-elements).

The production phase (modules A1–A3) shows the highest environmental impacts across all impact categories throughout the life cycle of all averages Qmax products. Within module A1, the most significant impacts are associated with the plastic powder used in Qmax products with ductile iron edge rails, while for Qmax products with galvanised steel edge rails, the dominant contribution comes from the galvanised steel edge rails. In module A3, the main environmental impacts are related to emissions from natural gas combustion and electricity consumption during the manufacturing process.

Environmental impact indicators

Acidification (AP)

Acidification is the process of increasing the acidity of soils, air, or water caused by an elevated concentration of hydrogen ions. An indicator of the impact category of acidification is accumulated exceedance (AE). The result is expressed in mol H⁺ eq.

Climate change (GWP)

Climate change is divided into three parts: biogenic, fossil, land use and land use transformation. An indicator called global warming potential (GWP100) is used to measure the amount of greenhouse gases contributing to global warming. The results are quantified in kilograms of CO₂ eq.

Ozone depletion (ODP)

Ozone layer depletion is the result of emissions of ozone-depleting substances, such as long-lived chlorine and bromine-containing gases (e.g., CFCs, HCFCs, Halons). It is quantified in kg CFC-11 eq., with the ozone depletion potential as its indicator.

Water use (WDP)

Water deprivation potential quantifies the potential of water deprivation to humans or ecosystems. It is quantified in m³ world eq. and helps evaluate the risks associated with water scarcity.

Photochemical oxidant formation (POCP)

The impact category photochemical oxidation formation aggregates substances that contribute to the formation of tropospheric ozone. The category indicator is tropospheric ozone concentration increase expressed in kg NMVOC eq.

Resources use. minerals and metals (ADP)

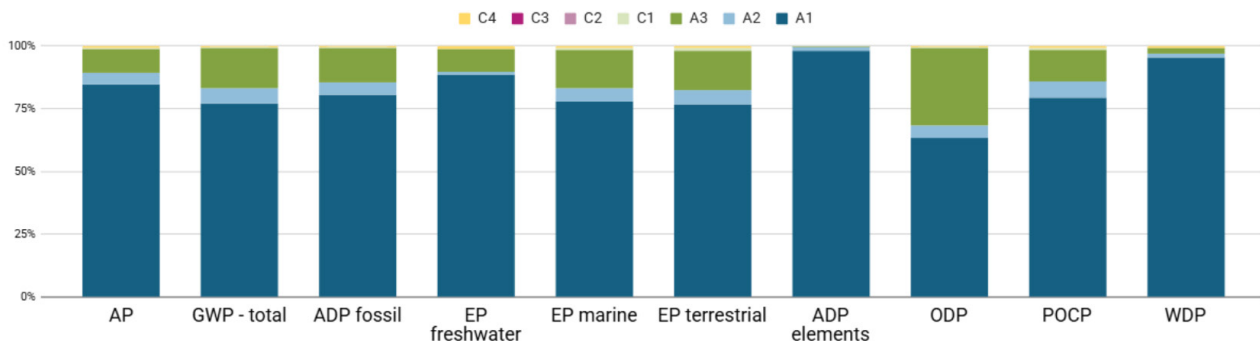
Resource scarcity and limitations for current and future generations include depletion of abiotic resources - elements (ADPe), quantified in kg Sb eq., and depletion of abiotic resources - fossil fuels (ADPf), quantified in MJ.

Eutrophication (EP)

Eutrophication enriches the environment with nutrients, impacting land, water, and seas, leading to excess plankton and algae growth, harming the water quality. It is categorised into terrestrial (accumulated exceedance expressed in mol N eq.), freshwater (nutrient fraction reaching freshwater end expressed in kg P eq.), and marine impacts (nutrient fraction reaching marine end expressed in kg N eq.)

Additional environmental information

Contribution of life cycle phases on the environmental impacts



Graph 2: Contribution of life cycle phases on the environmental impacts – Qmax- galvanised steel I

Table 24: Variations of results for maximum and minimum impact for products represented by Qmax- ductile iron I

Indicator	Average product (57.5% metal: 42.5% plastic)	50% metal : 50% plastic	Variations	65% metal: 35% plastic	Variations
AP	1.50E-02	1.59E-02	5.30%	1.52E-02	0.67%
GWP-total	3.87E+00	3.97E+00	2.66%	3.81E+00	-1.44%
GWP-fossil	3.89E+00	3.99E+00	2.50%	3.84E+00	-1.28%
GWP-biogenic	9.70E-03	1.05E-02	7.34%	9.02E-03	-7.54%
GWP-luluc	1.05E-02	9.27E-03	-13.68%	1.18E-02	10.93%
ADP-fossil*	7.18E+01	7.67E+01	6.37%	6.76E+01	-6.25%
EP-fw	9.87E-04	9.86E-04	-0.16%	9.90E-04	0.26%
EP-marine	3.93E-03	4.13E-03	4.84%	3.96E-03	0.81%
EP-terrestrial	4.08E-02	4.31E-02	5.21%	4.12E-02	0.85%
ADP-elements*	2.40E-05	2.55E-05	5.79%	2.26E-05	-6.07%
ODP	1.50E-07	1.56E-07	3.77%	1.45E-07	-3.45%
POCP	1.76E-02	1.88E-02	6.31%	1.72E-02	-2.61%
WDP*	6.79E-01	7.10E-01	4.33%	6.51E-01	-4.33%
Acronyms	<p>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-elements = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential. deprivation-weighted water consumption</p>				

Table 25: Variations of results for maximum and minimum impact for products represented by Qmax- ductile iron II

Indicator	Average product (42.5% metal: 57.5% plastic)	50% metal : 50% plastic	Variations	35% metal: 65% plastic	Variations
AP	1.58E-02	1.59E-02	0.62%	1.57E-02	-0.62%
GWP-total	4.03E+00	3.97E+00	-1.39%	4.08E+00	1.36%
GWP-fossil	4.04E+00	3.99E+00	-1.23%	4.09E+00	1.20%
GWP-biogenic	1.13E-02	1.05E-02	-8.12%	1.21E-02	6.32%
GWP-luluc	7.98E-03	9.27E-03	13.92%	6.69E-03	-19.29%
ADP-fossil*	8.09E+01	7.67E+01	-5.52%	8.51E+01	4.97%
EP-fw	9.82E-04	9.86E-04	0.40%	9.78E-04	-0.40%
EP-marine	4.09E-03	4.13E-03	0.82%	4.06E-03	-0.83%
EP-terrestrial	4.27E-02	4.31E-02	0.81%	4.24E-02	-0.83%
ADP-elements*	2.68E-05	2.55E-05	-5.39%	2.82E-05	4.87%
ODP	1.61E-07	1.56E-07	-3.22%	1.66E-07	3.02%
POCP	1.92E-02	1.88E-02	-2.36%	1.97E-02	2.26%
WDP*	7.38E-01	7.10E-01	-3.98%	7.66E-01	3.69%
Acronyms	<p>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-elements = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption</p>				

Table 26: Variations of results for maximum and minimum impact for products represented by Qmax- galvanised steel I

Indicator	Average product (56% metal: 44% plastic)	50% metal: 50% plastic	Variations	65% metal: 35% plastic	Variations
AP	1.74E-02	1.83E-02	5.03%	1.68E-02	-3.66%
GWP-total	5.05E+00	5.20E+00	2.81%	4.95E+00	-1.96%
GWP-fossil	4.98E+00	5.12E+00	2.67%	4.89E+00	-1.87%
GWP-biogenic	6.21E-02	7.08E-02	12.20%	5.64E-02	-10.21%
GWP-luluc	3.14E-03	3.36E-03	6.80%	2.98E-03	-5.11%
ADP-fossil*	8.77E+01	8.54E+01	-2.78%	8.93E+01	1.77%
EP-fw	1.84E-03	2.00E-03	8.02%	1.74E-03	-6.17%
EP-marine	4.49E-03	4.73E-03	5.13%	4.33E-03	-3.74%
EP-terrestrial	4.47E-02	4.70E-02	4.76%	4.32E-02	-3.45%
ADP-elements*	9.46E-05	1.06E-04	10.67%	8.71E-05	-8.65%
ODP	1.54E-07	1.48E-07	-3.97%	1.58E-07	2.48%
POCP	1.91E-02	1.91E-02	-0.04%	1.91E-02	0.03%
WDP*	1.39E+00	1.48E+00	6.41%	1.32E+00	-4.78%
Acronyms	<p>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-elements = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption</p>				

Table 27: Variations of results for maximum and minimum impact for products represented by Qmax- galvanised steel II

Indicator	Average product (44% metal: 56% plastic)	50% metal: 50% plastic	Variations	35% metal: 65% plastic	Variations
AP	1.62E-02	1.68E-02	3.48%	1.55E-02	-4.31%
GWP-total	4.83E+00	4.95E+00	2.53%	4.75E+00	-1.71%
GWP-fossil	4.77E+00	4.89E+00	2.44%	4.70E+00	-1.56%
GWP-biogenic	5.06E-02	5.64E-02	10.25%	4.31E-02	-17.31%
GWP-luluc	2.82E-03	2.98E-03	5.52%	2.64E-03	-6.71%
ADP-fossil*	9.04E+01	8.93E+01	-1.24%	9.41E+01	3.85%
EP-fw	1.63E-03	1.74E-03	6.32%	1.49E-03	-8.95%
EP-marine	4.20E-03	4.33E-03	2.95%	4.01E-03	-4.65%
EP-terrestrial	4.21E-02	4.32E-02	2.58%	4.04E-02	-4.17%
ADP-elements*	7.94E-05	8.71E-05	8.83%	6.98E-05	-13.78%
ODP	1.61E-07	1.58E-07	-2.03%	1.68E-07	4.39%
POCP	1.92E-02	1.91E-02	-0.22%	1.94E-02	1.39%
WDP*	1.26E+00	1.32E+00	5.01%	1.19E+00	-6.03%
Acronyms	<p>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-elements = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption</p>				



Organization:
ACO Industries Tábor s.r.o.
Průmyslová 1158
391 01 Sezimovo Ústí, CZ

Tel: +420 737 263 251
Email: kkalinova@aco.cz
Web: www.aco-industries.cz/tabor



National Environmental Labeling Program:
Ministry of the Environment of the Czech Republic
Vršovická 1442/65
100 10 Praha 10, CZ

Tel: +420 267 225 226
Email: info@mpz.cz
Web: www.mzp.cz



Organization:
Envitrail s.r.o.
Bucharova 2657/21
158 00 Praha 5

Tel: +420 737 780 600
Email: info@envitrail.com
Web: www.envitrail.cz

References

- [1] ISO 14040:2006 Environmental management - Life Cycle Assessment - Principles and Framework
- [2] ISO 14044:2006 Environmental management - Life Cycle Assessment – Requirements and guidelines
- [3] ISO 14025:2010 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- [4] EN 15804+A2:2020 Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
- [5] EN 16449:2014 Wood and wood-based products – Calculation of the biogenic carbon content of wood and conversion to carbon dioxide
- [6] ecoinvent. 2024. Life Cycle Inventory (LCI) datasets. ecoinvent database, version 3.11
<https://support.ecoinvent.org/ecoinvent-version-3.11>
- [7] EN 16449:2014 Wood and wood-based products – Calculation of the biogenic carbon content of wood and conversion to carbon dioxide
- [8] EUROPEAN COMMISSION. Environmental Footprint 3.1 reference package. Version 3.1. European Commission, 2023. <https://eplca.jrc.ec.europa.eu/LCDN/EN15804.html>