Environmental Product Declaration

According to EN15804+A2 (+indicators A1)

This declaration is for:

Walraven Maxx Heavy Rail Profile

Provided by:

J. van Walraven Holding B.V.

program operator

Stichting MRPI®

publisher

Stichting MRPI®

www.mrpi.nl

MRPI® registration

1.1.00522.2024

date of first issue

19-4-2024

date of this issue

19-4-2024

expiry date

19-4-2029

COMPANY INFORMATION

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MRPI® REGISTRATION

1.1.00522.2024

DATE OF ISSUE

19-4-2024

EXPIRY DATE

19-4-2029

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by Anne Kees Jeeninga, Advies Lab Vof. The LCA study has been done by Arunkumar Kuppusamy, J. van Walraven Holding B.V. The certificate is based on an LCA-dossier according to EN15804+A2 (+indicators A1). It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPD's of construction products may not be comparable if they do not comply with EN15804+A2. Declaration of SVHC that are listed on the 'Candidate list of Substances of Very High Concern for authorisation' when content exceeds the limits for registration with ECHA.

PROGRAM OPERATOR

Stichting MRPI®
Kingsfordweg 151
1043 GR
Amsterdam

Ing. L. L. Oosterveen MSc. MBA
Managing Director MRPI

PRODUCT

Walraven Maxx Heavy Rail Profile

DECLARED UNIT/FUNCTIONAL UNIT

1 meter of Walraven Maxx Heavy Rail Profile (100x120x4,0 mm) including the ancillary materials & its installation, internal transport and packaging materials.

DESCRIPTION OF PRODUCT

Walraven Maxx Heavy Rail profile used as complete, modular and innovative solutions for lightweight to heavy load applications.

VISUAL PRODUCT

MORE INFORMATION

https://www.walraven.com/int/walraven-rail-fixing-solutions/

DEMONSTRATION OF VERIFICATION
CEN standard EN15804 serves as the core PCR(a)
Independent verification of the declaration an data according to EN15804+A2 (+indicators A1) internal: external: x
Third party verifier: Anne Kees Jeeninga, Advieslab VOF
[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

In this case, the selected reference product is the 100x120x4,0 mm Walraven Maxx Heavy Rail Profile. The Walraven Maxx Rail is composed of a material distribution, consisting of 93,6% steel and 6,4% zinc. The steel component is further divided into 57% primary steel and 43% secondary steel, based on data from the custom-made Nationale Milieudatabase reference NMD v3.5 and Ecoinvent v3.6

To manufacture the Walraven Maxx Heavy Rail Profile of 100x120x4,0 mm dimension product, the steel coils of type St. 1,0039 (S250GD) were used. These coils undergo a series of processes, including flattening, perforating, and cold forming into fixing rails with the respective dimension (100x120x4,0 mm).

The reference service life of the fixing rail is stated to be 50 years. It's important to note that the indications provided for the service life should not be interpreted as a guarantee from the producer or the EPD program operator.

Detailed Product Description	Amount
Raw material, Steel Coil – Pre – Pregalvanized – Plain Weight	13,3 kg/m
Walraven Maxx Heavy Rail Profile – Perforated weight (100x120x4.0mm)	12,03 kg/m
Width	100mm
Height	120mm
Thickness	4,0mm
Primary material – Steel	57%
Secondary material - Steel	43%

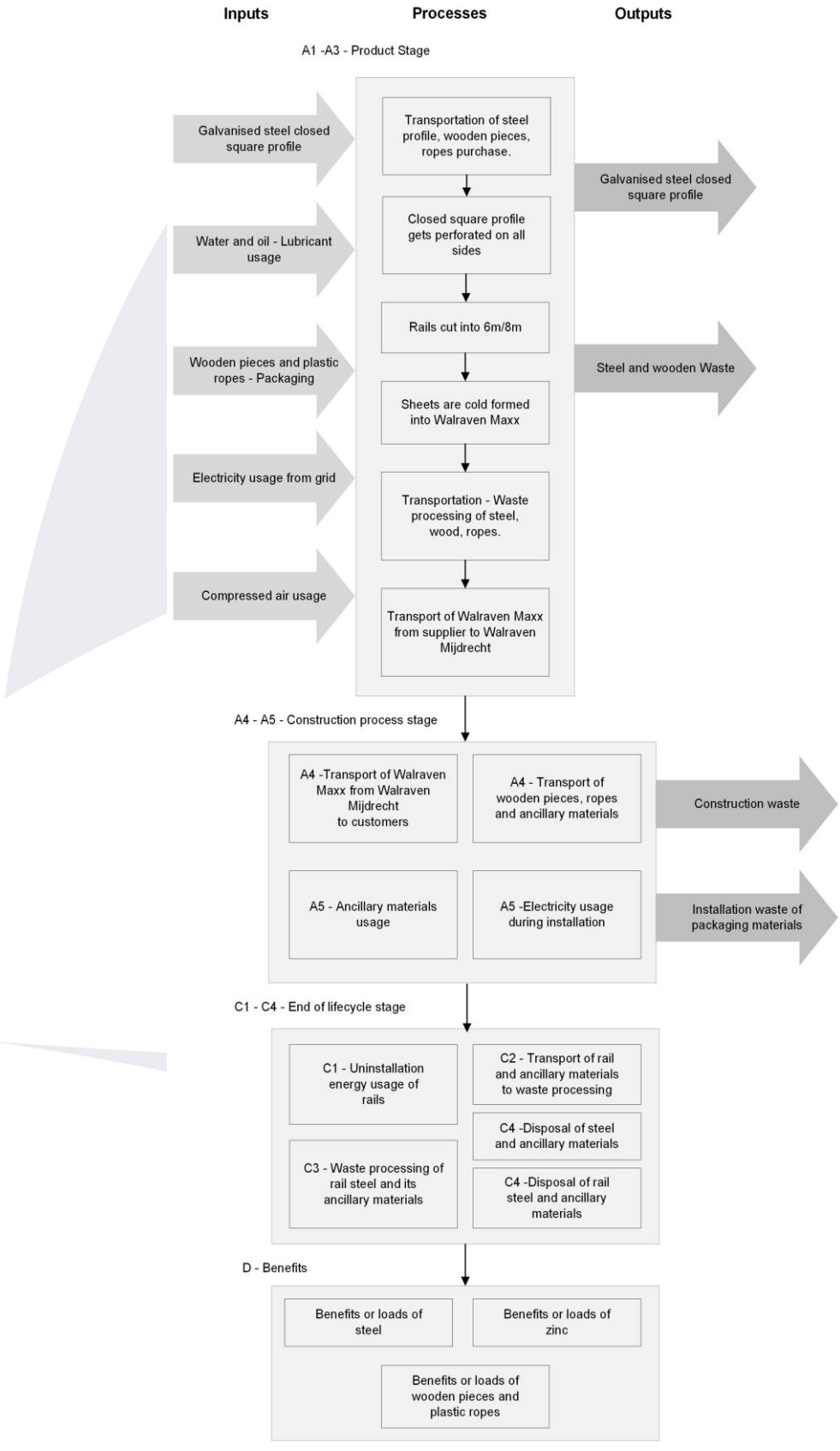
Component > 1% of total mass	(%)
Galvanized steel, low alloyed	93,6%
Zinc coating	6,4%

SCOPE AND TYPE

This study involves conducting a life cycle assessment (LCA) for the Walraven Fixing Rail, aiming to comprehensively analyze all life cycle phases from Cradle to Grave (A1 – D) using available data. Given that this calculation considers the full scope of LCA, the products produced are aggregated with other materials and processed into other products, thereby becoming integral components of a Functional Unit.

The LCA is performed using the Ecochain Mobius software, and background databases such as Nationale Milieudatabase v3.5 and EcoInvent 3.6 are utilized. This comprehensive approach ensures a thorough examination of the environmental impact of the Walraven Fixing Rail throughout its entire life cycle, from the extraction of raw materials (Cradle) to its final disposal or recycling (Grave). The inclusion of data from different life cycle stages provides a comprehensive understanding of the product's environmental footprint.

PRODUCT STAGE		CONSTRUCTION PROCESS STAGE			USER STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport gate to site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse- Recovery – Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
X= Modules Assessed ND= Not Declared																


Inputs
Processes
Outputs
A1 -A3 - Product Stage
Galvanised steel closed square profile
Water and oil - Lubricant usage
Wooden pieces and plastic ropes - Packaging
Electricity usage from grid
Compressed air usage
Transportation of steel profile, wooden pieces, ropes purchase.
Closed square profile gets perforated on all sides
Rails cut into 6m/8m
Sheets are cold formed into Walraven Maxx
Transportation - Waste processing of steel, wood, ropes.
Transport of Walraven Maxx from supplier to Walraven Mijdrecht
Galvanised steel closed square profile
Steel and wooden Waste
A4 - A5 - Construction process stage
A4 -Transport of Walraven Maxx from Walraven Mijdrecht to customers
A4 - Transport of wooden pieces, ropes and ancillary materials
A5 - Ancillary materials usage
A5 -Electricity usage during installation
Construction waste
Installation waste of packaging materials
C1 - C4 - End of lifecycle stage
C1 - Uninstallation energy usage of rails
C2 - Transport of rail and ancillary materials to waste processing
C4 -Disposal of steel and ancillary materials
C3 - Waste processing of rail steel and its ancillary materials
C4 -Disposal of rail steel and ancillary materials
D - Benefits
Benefits or loads of steel
Benefits or loads of zinc
Benefits or loads of wooden pieces and plastic ropes

REPRESENTATIVENESS

The aggregation were done by choosing the reference product as Walraven Maxx Heavy Profile (100x120x4,0 mm) for the number of products mentioned below. The remaining product which is aggregated in the same group by following the 20% allocation as per the EN 15804+A2 & NMD Bepalingsmethode v1.1 (2022) are listed below:

41x124(62x2)x2,5 - Walraven RapidStrut® BUP Double and Walraven RapidStrut® pre-galvanized double.
80x80x3,0 - Walraven Maxx Heavy Rail profile
100x100x3,0 - Walraven Maxx Heavy Rail profile

ENVIRONMENT IMPACT per functional unit or declared unit (core indicators A1)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	kg Sb eq.	6,64 E-02	4,95 E-05	-6,25 E-04	6,58 E-02	6,64 E-06	3,63 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,18 E-07	4,54 E-06	1,84 E-05	4,99 E-08	-5,85 E-03
ADPF	MJ	3,95 E+02	2,96 E+01	-3,26 E+00	4,22 E+02	3,97 E+00	3,16 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,08 E+00	2,72 E+00	4,63 E+00	1,43 E-01	-1,17 E+02
GWP	kg CO2 eq.	2,69 E+01	1,94 E+00	-3,70 E-01	2,85 E+01	2,60 E-01	2,19 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,03 E-02	1,78 E-01	3,44 E-01	6,30 E-03	-9,13 E+00
ODP	Kg CFC11 eq.	1,66 E-06	3,44 E-07	1,88 E-08	2,02 E-06	4,61 E-08	1,37 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,91 E-09	3,15 E-08	4,17 E-08	1,66 E-09	-3,19 E-07
POCP	Kg ethene eq.	3,11 E-02	1,17 E-03	-1,90 E-03	3,04 E-02	1,57 E-04	2,03 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,89 E-05	1,07 E-04	2,95 E-04	5,62 E-06	-1,98 E-02
AP	kg SO2 eq.	1,28 E-01	8,53 E-03	-8,47 E-04	1,36 E-01	1,14 E-03	1,77 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,47 E-04	7,82 E-04	3,22 E-03	3,67 E-05	-3,10 E-02
EP	kg (PO4) 3- eq.	1,83 E-02	1,67 E-03	-5,33 E-05	1,99 E-02	2,24 E-04	3,39 E-03	0,0 0E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,45 E-05	1,54 E-04	4,14 E-04	7,72 E-06	-3,71 E-03
Toxicity indicators for Dutch market																			
HTP	kg DCB-Eq	7,61 E+01	8,16 E-01	-4,31 E-01	7,65 E+01	1,09 E-01	5,06 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,38 E-02	7,49 E-02	4,12 E-01	4,88 E-03	-5,72 E+00
FAETP	kg DCB-Eq	4,95 E-01	2,38 E-02	1,01 E-02	5,29 E-01	3,19 E-03	5,57 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,26 E-04	2,19 E-03	7,53 E-03	1,59 E-03	6,11 E-02
MAETP	kg DCB-Eq	1,14 E+03	8,57 E+01	2,16 E+01	1,25 E+03	1,15 E+01	7,89 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,89 E+00	7,86 E+00	3,23 E+01	4,69 E-01	5,01 E+01
TETP	kg DCB-Eq	4,52 E-01	2,89 E-03	5,35 E-02	5,08 E-01	3,87 E-04	4,17 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,67 E-04	2,65 E-04	1,28 E-03	1,21 E-05	4,75 E-01
ECI	euro	€ 9,131	€ 0,234	-€ 0,060	€ 9,305	€ 0,031	€ 0,685	€ 0,00	€ 0,00	€ 0,00	€ 0,00	€ 0,00	€ 0,00	€ 0,00	€ 0,007	€ 0,021	€ 0,075	€ 0,001	-€ 1,143
ADPF	kg Sb eq.	1,90 E-01	1,43 E-02	-1,57 E-03	2,03 E-01	1,91 E-03	1,52 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,19 E-04	1,31 E-03	2,23 E-03	6,90 E-05	-5,65 E-02

ADPE = Abiotic Depletion Potential for non-fossil resources
ADPF = Abiotic Depletion Potential for fossil resources
GWP = Global Warming Potential
ODP = Depletion potential of the stratospheric ozone layer
POCP = Formation potential of tropospheric ozone photochemical oxidants
AP = Acidification Potential of land and water
EP = Eutrophication Potential
HTP = Human Toxicity Potential
FAETP = Fresh water aquatic ecotoxicity potential
MAETP = Marine aquatic ecotoxicity potential
TETP = Terrestrial ecotoxicity potential
ECI = Environmental Cost Indicator
ADPF = Abiotic Depletion Potential for fossil resources expressed in [kg Sb-eq.]

ENVIRONMENT IMPACT per functional unit or declared unit (core indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	2,80 E+01	1,96 E+00	-4,11 E-01	2,95 E+01	2,62 E-01	2,27 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,30 E-02	1,79 E-01	2,50 E-01	6,79 E-03	-9,77 E+00
GWP-fossil	kg CO2 eq.	2,79 E+01	1,96 E+00	-4,33 E-01	2,94 E+01	2,62 E-01	2,25 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,07 E-02	1,79 E-01	3,48 E-01	6,47 E-03	-9,78 E+00
GWP-biogenic	kg CO2 eq.	6,19 E-02	9,03 E-04	2,05 E-02	8,33 E-02	1,21 E-04	1,29 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,15 E-03	8,28 E-05	-9,89 E-02	3,18 E-04	0,00 E+00
GWP-luluc)	kg CO2 eq.	2,77 E-02	7,17 E-04	1,58 E-03	3,00 E-02	9,60 E-05	8,48 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,64 E-04	6,57 E-05	3,78 E-04	1,61 E-06	7,20 E-03
ODP	kg CFC11 eq.	1,67 E-06	4,32 E-07	1,95 E-08	2,13 E-06	5,78 E-08	1,39 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,98 E-09	3,96 E-08	4,85 E-08	2,04 E-09	-2,42 E-07
AP	mol H+ eq.	1,57 E-01	1,13 E-02	-1,07 E-03	1,68 E-01	1,52 E-03	2,75 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,13 E-04	1,04 E-03	4,03 E-03	4,94 E-05	-3,80 E-02
EP-freshwater	kg PO4 eq.	2,00 E-02	1,79 E-04	2,49 E-05	2,02 E-02	2,40 E-05	1,52 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	7,09 E-05	1,64 E-05	2,80 E-04	7,28 E-07	-4,19 E-03
EP-marine	kg N eq.	3,52 E-02	4,03 E-03	-2,40 E-04	3,90 E-02	5,40 E-04	3,00 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,78 E-05	3,69 E-04	9,23 E-04	2,12 E-05	-7,54 E-03
EP-terrestrial	mol N eq.	3,55 E-01	4,41 E-02	-3,08 E-03	3,96 E-01	5,90 E-03	9,88 E-02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	6,46 E-04	4,04 E-03	1,03 E-02	2,02 E-04	-8,23 E-02
POCP	kg NMVOC eq.	1,35 E-01	1,26 E-02	-4,37 E-03	1,44 E-01	1,69 E-03	9,10 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,64 E-04	1,15 E-03	2,83 E-03	5,79 E-05	-5,56 E-02
ADP-minerals & metals	kg Sb eq.	6,64 E-02	4,95 E-05	-6,25 E-04	6,58 E-02	6,64 E-06	3,63 E-03	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	5,18 E-07	4,54 E-06	1,84 E-05	4,99 E-08	-5,85 E-03
ADP-fossil	MJ, net calorific value	3,23 E+02	2,95 E+01	2,94 E+00	3,55 E+02	3,95 E+00	2,59 E+01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,46 E+00	2,70 E+00	4,74 E+00	1,52 E-01	-6,86 E+01
WDP	m3 world eq. Deprived	9,72 E+00	1,05 E-01	-9,54 E-02	9,73 E+00	1,41 E-02	1,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,63 E-02	9,67 E-03	4,97 E-02	8,26 E-04	-1,89 E+00

GWP-total = Global Warming Potential total
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 Exceedence
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 Exceedence
POCP = Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals&metals = Abiotic Depletion Potential for non fossil resources [2]
ADP-fossil = Abiotic Depletion for fossil resources potential [2]
WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

Disclaimer [2]
- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

ENVIRONMENT IMPACT per functional unit or declared unit (additional indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	2,35 E-06	1,76 E-07	-4,60 E-08	2,48 E-06	2,35 E-08	2,70 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,08 E-09	1,61 E-08	5,08 E-08	1,01 E-09	-5,64 E-07
IRP	kBq U235 eq.	2,13 E+00	1,42 E-01	2,43 E-01	2,52 E+00	1,90 E-02	1,63 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,90 E-02	1,30 E-02	4,78 E-02	1,11 E-03	4,64 E-01
ETP-fw	CTUe	1,65 E+03	2,63 E+01	-2,61 E+01	1,65 E+03	3,52 E+00	1,08 E+02	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,00 E+00	2,41 E+00	1,97 E+01	7,20 E-01	-3,50 E+02
HTP-c	CTUh	2,18 E-07	8,53 E-10	4,70 E-11	2,18 E-07	1,14 E-10	1,44 E-08	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	2,58 E-11	7,82 E-11	5,01 E-10	6,95 E-12	-2,26 E-09
HTP-nc	CTUh	2,79 E-06	2,88 E-08	2,05 E-07	3,03 E-06	3,85 E-09	1,89 E-07	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	8,80 E-10	2,64 E-09	2,29 E-08	5,64 E-10	1,87 E-06
SQP	----	9,52 E+01	2,54 E+01	3,31 E+00	1,24 E+02	3,40 E+00	3,98 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	3,57 E-01	2,33 E+00	9,17 E+00	1,40 E-01	2,44 E+00

PM = Potential incidence of disease due to PM emissions
IRP = Potential Human exposure efficiency relative to U235 [1]
ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]
HTP-c = Potential Comparative Toxic Unit for humans [2]
HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]
SQP = Potential soil quality index [2]

Disclaimer [1]
- This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste.

Disclaimer [2]
- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

OUTPUT FLOWS AND WASTE CATEGORIES per functional unit or declared unit (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	9,75 E-03	7,47 E-05	-1,10 E-04	9,71 E-03	1,00 E-05	5,49 E-04	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	9,71 E-07	6,85 E-06	1,40 E-05	1,87 E-07	-1,17 E-03
NHWD	kg	1,00 E+01	1,87 E+00	-5,78 E-02	1,18 E+01	2,50 E-01	6,90 E-01	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	4,94 E-03	1,71 E-01	9,04 E-02	-6,16 E-01	-1,00 E+00
RWD	kg	8,59 E-04	1,94 E-04	6,12 E-05	1,11 E-03	2,59 E-05	6,35 E-05	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	1,04 E-05	1,78 E-05	2,76 E-05	1,00 E-06	5,88 E-05
CRU	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
MFR	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
MER	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
EEE	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
ETE	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00

HWD = Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
MFR = Materials for recycling
EEE = Exported Electrical Energy
NHWD = Non Hazardous Waste Disposed
CRU = Components for reuse
MER = Materials for energy recovery
ETE = Exported Thermal Energy

RESOURCE USE per functional unit or declared unit (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PERM	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PERT	MJ	3,11 E+01	3,69 E-01	1,84 E+00	3,33 E+01	4,95 E-02	2,53 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	2,83 E-01	3,39 E-02	7,20 E-01	8,42 E-03	2,00 E+00
PENRE	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PENRM	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
PENRT	MJ	3,43 E+02	3,13 E+01	3,23 E+00	3,77 E+02	4,19 E+00	2,76 E+01	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	1,53 E+00	2,87 E+00	5,02 E+00	1,61 E-01	-7,12 E+01
SM	kg	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
RSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
NRSF	MJ	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00
FW	m3	3,07 E-01	3,59 E-03	3,76 E-03	3,14 E-01	4,81 E-04	3,08 E-02	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	1,24 E-03	3,29 E-04	2,27 E-03	1,89 E-04	-3,58 E-02

PERE = Use of renewable energy excluding renewable primary energy resources
PERM = Use of renewable energy resources used as raw materials
PERT = Total use of renewable primary energy resources
PENRE = Use of non-renewable primary energy resources excluding non-renewable 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 resources
SM = Use of secondary materials
RSF = Use of renewable secondary fuels
NRSF = Use of non renewable secondary fuels
FW = Use of net fresh water

BIOGEEN CARBON CONTENT per functional unit or declared unit (A1 / A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
BBCpr	Kg C	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00
BCCpa	kg C	0,00 E+00	0,00 E+00	0,00 E+00	0,00 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00	0 E+00

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging

CALCULATION RULES

Data Quality

Data flows have been modelled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources and databases.

Data collection period

The dataset is representative for the production processes used in 2022 and 2023.

Methodology and reproducibility

The data regarding all the steel coils were collected from the supplier through the data collection template regarding the materials, transport, etc. For suppliers that have not delivered sufficient information, alternative sources such as public references, industry statistics, and literature references have been used. Based on this information, representative references from the Ecoinvent v3.6 and Nationale Milieudatabase v3.5 (NMD) has been selected for the various materials and resources used for the Walraven Fixing rails.

The end-of-life processing for phase C2-C4 + D follows standardized scenarios outlined in NEN-EN15804+A2 (version 1.1, March 2022), which is the Environmental Performance Assessment Method for Construction Works.

In this case of Walraven Rail systems, both worst case scenario and 20% allocation methods were used for the grouping by choosing the reference products following the Bepalingsmethode v1.1 (2022).

Inventory and Allocation

In this section, the quantity, quality, and allocation of various materials, energy streams, and emissions by processes and products are outlined. The system boundaries that have been adopted are in accordance with the modular approach of I.S. EN 15804+A2 & NMD Bepalingsmethode v1.1 (2022). Due to the different products involved in this modelling, by choosing the worst-case scenario of taking the reference value of 100x120x4,0 mm Walraven Maxx Heavy Rail Profile and trying to group the products which has smaller deviations in the overall impact categories by following the 20% allocation as per the EN 15804+A2 & NMD Bepalingsmethode v1.1 (2022). The remaining dimensions were grouped along with 100x120x4,0 mm (Walraven Maxx Heavy Rail Profile) were listed above.

Data Sources

The data used for the Walraven Fixing Rail products, its transport and installation processes come from the energy and resources administration, production, sourcing, and planning departments of Walraven. Distance from the raw material suppliers (possibly through the intermediary) and technical information sheet of the raw material has also been inventoried. And due to the unavailability of some raw material composition data, the generic reference for steel from NMD v3.5 and Ecoinvent v3.6 databases were chosen for the LCA modelling.

SENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Modules A1 to A3 cover the life cycle stages, beginning with A1 focusing on the extraction of raw materials, usages - water and oil – lubricant, usage of wooden pieces for stacking and transporting, packaging plastic straps usage

Module A2 explains the transportation from the material suppliers to the production sites (Walraven). Includes the transport distance of the purchased plastic straps was 1050 km. Transport of purchased wooden pieces to Walraven was 1050 km. Transport from steel coil suppliers to Walraven by following the Bepalingsmethode v1.1, average distance was calculated for the transportation was 1084 km. And transport reference - 0001-tra&Transport, truck (o.b.v. Transport, freight, lorry, unspecified {GLO}| market group for transport, freight, lorry, unspecified | Cut-off, U), Nationale Milieudatabase v3.5 (Dutch), SBK NMD / Transport processes were used.

Module A3: In this section, the environmental impact during the production stage is modelled. This includes direct emissions, the usage of electricity, fuels, packaging, and other materials. Production wastes must be accounted for in the same life stage they are created. Therefore, the end-of-life scenarios for the production wastes are also counted in this module.

Regarding the electricity consumption, the electricity was consumed from only the grid. Therefore the reference - 0124-pro&1 kWh, out stopcontact (o.b.v. Electricity, low voltage {NL}| market for | Cut-off, U), Netherlands, Nationale Milieudatabase v3.5 (Dutch), SBK NMD / Electricity and fuel for grid were used.

Regarding the production waste, - Production Waste treatment/recycling (100%), Transport to waste processing – Steel (standard value from Bepalingsmethode as 50km), Benefits of steel – production waste and Benefits of Zinc– production waste were considered.

Module A4 addresses the transportation of Walraven Fixing rails from our production locations to customers. The Ecoinvent v3.6 and NMD v3.5 records for transport are according to I.S. EN 15804+A2. These records include and average load factor of 50%, in other words full to the installation location and an empty return. It was calculated by considering the standard value of other materials, products, and elements from Bepalingsmethode as 150 km.

Reference: Diesel Truck - 0001-tra&Transport, truck (o.b.v. Transport, freight, lorry, unspecified {GLO}| market group for transport, freight, lorry, unspecified | Cut-off, U), Nationale Milieudatabase v3.5 (Dutch), SBK NMD / Transport processes were used.

Module A5 delves into the installation process of Walraven Fixing rails, All relevant installation processes are included. These include fuel and energy usage as well as potential installation losses.

In the construction waste, by following the Bepalingsmethode of construction waste of prefab products, 3% material loss were considered. Transport to waste processing by considering the standard value from Bepalingsmethode as 100km was used. Waste processing of construction waste steel were considered as 100%. For Disposal of waste steel and benefits of recycling, the fixed values of end-of-life processing scenarios associated with the determination method of the environmental performance construction works published by NMD following the Bepalingsmethode v1.1 (2022) was used.

End Of Life Scenario Fixed Values: Distribution over fractions (%) - 75.Steel, Zinc/galvanized steel : Leave - 0%, Landfill - 5%, WIP - 0%, Recycling - 95%, Reuse - 0% were considered.

For Installation waste of packaging material, also the fixed values of end-of-life processing scenarios were used.

End Of Life Scenario Fixed Values: Distribution over fractions (%)

57. Plastic straps	Leave	Landfill	WIP	Recycling	Reuse
	0%	10%	85%	5%	0%
34. Wood, planks	0%	5%	80%	10%	5%

Deconstruction (C): (C1 -C4):

Module C1 takes into account the uninstallation and demolition processes.

Module C2 considers the transportation of steel (Rails) to waste processing.

Module C3 covers the waste processing of Walraven Fixing rails, specifically galvanized steel, emphasizing reuse, recovery, and recycling.

Module C4 accounts for the disposal of waste steel.

End Of Life Scenario Fixed Values (Ancillary materials) : Distribution over fractions (%) -69. Ancillary material (steel, fasteners) : Leave - 0%, Landfill - 1%, WIP - 0%, Recycling - 99%, Reuse - 0% were considered.

End Of Life Scenario Fixed Values (Steel - Fixing Rail): Distribution over fractions (%) - 75.Steel,Zinc/galvanized steel : Leave - 0%, Landfill - 5%, WIP - 0%, Recycling - 95%, Reuse - 0% were considered.

Module D, which explores benefits and loads beyond the system boundary, focuses on the reuse, recovery, and recycling potential. This module analyzes the benefits and loads associated with raw materials such as steel and zinc, as well as ancillary materials.

End Of Life Scenario Fixed Values : Distribution over fractions (%) - 75.Steel,Zinc/galvanized steel : Leave - 0%, Landfill - 5%, WIP - 0%, Recycling - 95%, Reuse - 0% were considered.

DECLARATION OF SVHC

No substances that are listed in the latest “Candidate List of Substances of Very High Concern for authorisation” are included in the product that exceeds the limit for registration.

REFERENCES

- Ecochain Mobius V 0.9.331 software.
- EN 15804: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products', EN 15804:2019+A2.
- ISO 14040: Environmental management - Life cycle assessment - Principles and Framework', International Organization for Standardization, ISO14040:2006.
- ISO 14044: Environmental management - Life cycle assessment - Requirements and guidelines', International Organization for Standardization, ISO14044:2006.
- ISO 14025: Environmental labels and declarations -- Type III environmental declarations - Principles and procedures', International Organization for Standardization, ISO14025:2006.
- NMD, "Bepalingsmethode ‘Milieuprestatie Bouwwerken’ versie 1.1 inclusief de bijbehorende wijzigingsbladen," 2022.
- NEN, "'NEN-EN 15804: Duurzaamheid van bouwwerken - Milieuverklaringen van producten - Basisregels voor de productgroep bouwproducten', NEN-EN 15804:2012+A1:2013," 2013.
- NMD, "Environmental Performance Assessment Method for Construction Works," March 2022.

REMARKS

None