Environmental Product Declaration

According to EN15804+A2 (+indicators A1)

This declaration is for:

Walraven RapidRail® and Walraven RapidStrut® - Light Fixing Rails and Channels

Provided by:

J. van Walraven Holding B.V.



program operator
Stichting MRPI®
publisher
Stichting MRPI®
www.mrpi.nl

MRPI® registration
1.1.00520.2024
date of first issue
19-4-2024
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COMPANY INFORMATION

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PRODUCT

Walraven RapidRail® Fixing Rail and Walraven RapidStrut® Channel

DECLARED UNIT/FUNCTIONAL UNIT

1 meter of Walraven RapidRail® Fixing Rail and Walraven RapidStrut® Channel (41x21x2,5 mm) including the ancillary materials & its installation, internal transport and packaging materials.

DESCRIPTION OF PRODUCT

Walraven RapidRail® Fixing Rail and Walraven RapidStrut® Channel systems used as complete, modular and innovative solutions for lightweight to medium load applications.

MRPI® REGISTRATION

1.1.00520.2024

DATE OF ISSUE

19-4-2024

EXPIRY DATE

19-4-2029

VISUAL PRODUCT



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.

MORE INFORMATION

https://www.walraven.com/int/walraven-rail-systems/

PROGRAM OPERATOR

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Managing Director MRPI

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, Advies Lab Vof
[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

The Walraven RapidRail® Fixing Rail and RapidStrut® 41x21x2,5 mm Channel were selected as the reference product. The composition of the respective Walraven Fixing Rail and Channel includes a material distribution of 93,6% steel and 6,4% zinc. Within the steel component, it is further divided into 57% primary steel and 43% secondary steel, as specified by the custom-made Nationale Milieudatabase reference NMD v3.5 and Ecoinvent v3.6.

In the manufacturing process, steel coils St. 1,0242 (S250GD) with surface treatments of Z275-M-A-C (pre-galvanized) & Z310-M-A-C (pre-galvanized), along with Stainless Steel - 1,4404 (AISI 316L), were employed to produce the 41x21x2,5 mm dimension products. These products include the Walraven RapidStrut® Channel – Pregalvanized, Walraven RapidRail® Stainless Steel Fixing rail single, C profile, and Walraven RapidStrut® Channel (BUP1000).

The steel coils undergo a series of processes, including flattening, perforating, and cold forming into fixing rails and channels with the respective dimension (41x21x2,5 mm).

The reference service life of the Walraven Fixing Rails and Channels is stated to be 50 years. It is important to note that the indications provided for the service life should not be interpreted as a guarantee given by the producer or the EPD program operator.

Detailed Product Description	Amount
Raw material. Steel coil – Pregalvanized – Plain weight	1,884 kg/m
Walraven RapidRail® Fixing Rail and RapidStrut® Channel - Perforated weight (41x21x2,5 mm)	1,741 kg/m
Width	41mm
Height	82mm
Thickness	2,5mm
Primary aterial – Steel	57%
Secondary material – Steel	43%

Component (> 1%)	(kg / %)
Galvanized steel, low alloyed	93,6%
Zinc coating	6,4%

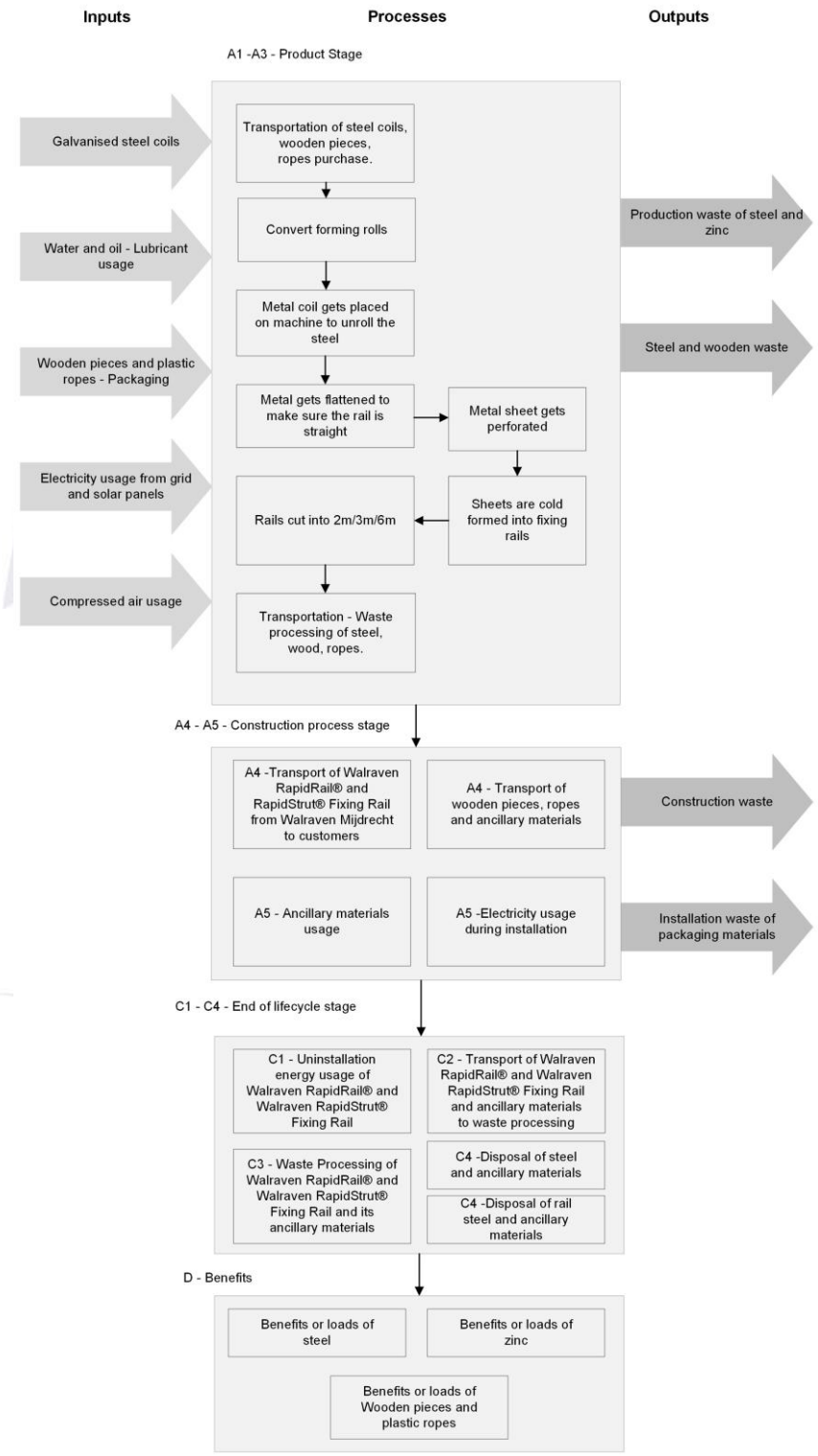
SCOPE AND TYPE

This study involves conducting a life cycle assessment (LCA) for the Walraven Fixing Rail and Channel, 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 v3.6 are utilized. This comprehensive approach ensures a thorough examination of the environmental impact of the Walraven Fixing Rail and Channel 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 coils
Water and oil - Lubricant usage
Wooden pieces and plastic ropes - Packaging
Electricity usage from grid and solar panels
Compressed air usage
Transportation of steel coils, wooden pieces, ropes purchase.
Convert forming rolls
Metal coil gets placed on machine to unroll the steel
Metal gets flattened to make sure the rail is straight
Metal sheet gets perforated
Sheets are cold formed into fixing rails
Rails cut into 2m/3m/6m
Transportation - Waste processing of steel, wood, ropes.
Production waste of steel and zinc
Steel and wooden waste
A4 - A5 - Construction process stage
A4 -Transport of Walraven RapidRail® and RapidStrut® Fixing Rail 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 Walraven RapidRail® and Walraven RapidStrut® Fixing Rail
C2 - Transport of Walraven RapidRail® and Walraven RapidStrut® Fixing Rail and ancillary materials to waste processing
C3 - Waste Processing of Walraven RapidRail® and Walraven RapidStrut® Fixing Rail and its ancillary materials
C4 -Disposal of steel and 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 RapidRail® Fixing Rail and Walraven RapidStrut® Channel (41x21x2,5 mm) for the remaining product 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.

27x18x1,00 - Walraven RapidRail® - Fixing Rail
30x20x1,25 - Walraven RapidRail® - Fixing Rail and Walraven RapidRail® Stainless Steel Fixing Rail single, C profile
30x15x1,50 - Walraven RapidRail® - Fixing Rail and Walraven RapidRail® Stainless Steel Fixing Rail single, C profile
30x30x1,50 - Walraven RapidRail® - Fixing Rail and Walraven RapidRail® Stainless Steel Fixing Rail single, C profile
41x21x1,5 - Walraven RapidStrut® Channel – Pregalvanized
41x21x2,0 - Walraven RapidStrut® Channel – Pregalvanized
41x41x1,5 - Walraven RapidStrut® Channel – Pregalvanized
38x40x2,0 - Walraven RapidRail® - Fixing Rail
30x45x2,0 - Walraven RapidRail® - Fixing Rail
41x41x2,0 - Walraven RapidStrut® Channel (BUP1000) and Walraven RapidStrut® Channel – Pregalvanized

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.	9,40 E-03	1,78 E-06	-6,75 E-05	9,34 E-03	1,36 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	1,08 E-06	3,87 E-06	1,51 E-08	-8,46 E-04
ADPF	MJ	6,12 E+01	1,06 E+00	3,64 E+00	6,59 E+01	8,14 E-01	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	6,46 E-01	1,09 E+00	4,30 E-02	-1,72 E+01
GWP	kg CO2 eq.	3,98 E+00	6,96 E-02	2,20 E-01	4,27 E+00	5,32 E-02	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	4,23 E-02	8,56 E-02	2,39 E-03	-1,30 E+00
ODP	Kg CFC11 eq.	2,43 E-07	1,24 E-08	3,22 E-08	2,88 E-07	9,44 E-09	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	7,50 E-09	9,37 E-09	4,95 E-10	-5,07 E-08
POCP	Kg ethene eq.	4,60 E-03	4,20 E-05	-1,31 E-04	4,51 E-03	3,21 E-05	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	2,55 E-05	6,67 E-05	1,77 E-06	-2,67 E-03
AP	kg SO2 eq.	1,88 E-02	3,06 E-04	1,33 E-03	2,04 E-02	2,34 E-04	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	1,86 E-04	6,82 E-04	1,10 E-05	-4,21 E-03
EP	kg (PO4)3- eq.	2,66 E-03	6,01 E-05	1,68 E-04	2,89 E-03	4,60 E-05	3,39 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	4,45 E-05	3,65 E-05	8,94 E-05	2,38 E-06	-5,01 E-04
Toxicity indicators for Dutch market																			
HTP	kg DCB-Eq	1,08 E+01	2,93 E-02	4,00 E-02	1,09 E+01	2,24 E-02	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	1,78 E-02	9,81 E-02	1,45 E-03	-7,72 E-01
FAETP	kg DCB-Eq	7,10 E-02	8,56 E-04	3,15 E-03	7,50 E-02	6,54 E-04	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	5,19 E-04	1,69 E-03	4,98 E-04	8,11 E-03
MAETP	kg DCB-Eq	1,65 E+02	3,08 E+00	1,12 E+01	1,79 E+02	2,35 E+00	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	1,87 E+00	6,90 E+00	1,81 E-01	6,53 E+00
TETP	kg DCB-Eq	6,40 E-02	1,04 E-04	8,29 E-03	7,24 E-02	7,92 E-05	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	6,29 E-05	3,08 E-04	3,57 E-06	6,39 E-02
ECI	euro	€ 1,308	€ 0,008	€ 0,023	€ 1,339	€ 0,006	€ 0,685	€ 0,00	€ 0,00	€ 0,00	€ 0,00	€ 0,00	€ 0,00	€ 0,00	€ 0,007	€ 0,005	€ 0,018	€ 0,000	€ - 0,236
ADPF	kg Sb eq.	2,94 E-02	5,12 E-04	1,75 E-03	3,17 E-02	3,91 E-04	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	3,11 E-04	5,26 E-04	2,07 E-05	-8,27 E-03

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.	4,10 E+00	7,03 E-02	2,26 E-01	4,40 E+00	5,37E-02	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	4,27 E-02	8,57 E-02	2,64 E-03	-1,39 E+00
GWP-fossil	kg CO2 eq.	4,12 E+00	7,02 E-02	2,15 E-01	4,41 E+00	5,37E-02	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	4,26 E-02	8,67 E-02	2,50 E-03	-1,39 E+00
GWP-biogenic	kg CO2 eq.	-2,46 E-02	3,24 E-05	1,04 E-02	-1,42 E-02	2,48E-05	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	1,97 E-05	-1,06 E-03	1,34 E-04	0,00 E+00
GWP-luluc)	kg CO2 eq.	4,02 E-03	2,57 E-05	8,20 E-04	4,87 E-03	1,97E-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	1,56 E-05	8,50 E-05	4,92 E-07	9,67 E-04
ODP	kg CFC11 eq.	2,47 E-07	1,55 E-08	2,49 E-08	2,88 E-07	1,18E-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	9,41 E-09	1,09 E-08	6,10 E-10	-4,14 E-08
AP	mol H+ eq.	2,31 E-02	4,07 E-04	1,57 E-03	2,50 E-02	3,11E-04	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	2,47 E-04	8,54 E-04	1,48 E-05	-5,15 E-03
EP-freshwater	kg PO4 eq.	2,88 E-03	6,43 E-06	2,82 E-04	3,17 E-03	4,92E-06	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	3,90 E-06	5,85 E-05	2,20 E-07	-5,67 E-04
EP-marine	kg N eq.	5,13 E-03	1,45 E-04	2,37 E-04	5,51 E-03	1,11E-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	8,78 E-05	2,04 E-04	8,31 E-06	-1,02 E-03
EP-terrestrial	mol N eq.	5,19 E-02	1,58 E-03	2,19 E-03	5,56 E-02	1,21E-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	9,60 E-04	2,22 E-03	6,03 E-05	-1,11 E-02
POCP	kg NMVOC eq.	1,99 E-02	4,52 E-04	1,66 E-04	2,05 E-02	3,45E-04	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	2,74 E-04	6,16 E-04	1,74 E-05	-7,51 E-03
ADP-minerals & metals	kg Sb eq.	9,40 E-03	1,78 E-06	-6,75 E-05	9,34 E-03	1,36E-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	1,08 E-06	3,87 E-06	1,51 E-08	-8,46 E-04
ADP-fossil	MJ, net calorific value	5,08 E+01	1,06 E+00	5,83 E+00	5,77 E+01	8,10E-01	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	6,43 E-01	1,11 E+00	4,53 E-02	-1,05 E+01
WDP	m3 world eq. Deprived	1,46 E+00	3,79 E-03	5,41 E-02	1,52 E+00	2,90E-03	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	2,30 E-03	1,32 E-02	3,25 E-04	-2,63 E-01

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 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 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	3,39 E-07	6,31 E-09	-2,27 E-10	3,45 E-07	4,82 E-09	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	3,83 E-09	1,10 E-08	3,03 E-10	-7,59 E-08
IRP	kBq U235 eq.	3,13 E-01	5,09 E-03	1,76 E-01	4,94 E-01	3,89 E-03	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	3,09 E-03	1,04 E-02	3,26 E-04	6,19 E-02
ETP-fw	CTUe	2,36 E+02	9,44 E-01	1,89 E+00	2,39 E+02	7,22 E-01	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	5,73 E-01	4,11 E+00	2,07 E-01	-4,75 E+01
HTP-c	CTUh	3,08 E-08	3,06 E-11	1,70 E-10	3,10 E-08	2,34 E-11	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	1,86 E-11	1,21 E-10	2,03 E-12	-2,85 E-10
HTP-nc	CTUh	3,96 E-07	1,03 E-09	2,82 E-08	4,25 E-07	7,90 E-10	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	6,27 E-10	4,81 E-09	1,62 E-10	2,51 E-07
SQP	----	1,67 E+01	9,12 E-01	1,75 E+00	1,94 E+01	6,98 E-01	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	5,54 E-01	1,96 E+00	4,19 E-02	2,41 E-01

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	1,38 E-03	2,68 E-06	-4,46 E-06	1,38 E-03	2,05 E-06	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	1,63 E-06	3,06 E-06	5,65 E-08	-1,60 E-04
NHWD	kg	1,43 E+00	6,71 E-02	1,52 E-02	1,51 E+00	5,13 E-02	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	4,07 E-02	2,29 E-02	-1,74 E-01	-1,35 E-01
RWD	kg	1,27 E-04	6,95 E-06	4,68 E-05	1,81 E-04	5,32 E-06	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	4,22 E-06	6,15 E-06	2,98 E-07	7,35 E-06
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	5,40 E+01	1,12 E+00	6,12 E+00	6,12 E+01	8,59 E-01	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	6,82 E-01	1,18 E+00	4,81 E-02	-1,10 E+01
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	4,91 E+00	1,33 E-02	1,32 E+00	6,25 E+00	1,01 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	8,05 E-03	1,52 E-01	2,43 E-03	2,48 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	4,55 E-02	1,29 E-04	5,16 E-03	5,08 E-02	9,86 E-05	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	7,83 E-05	5,48 E-04	5,60 E-05	-4,88 E-03

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) database have been selected for the various materials and resources used for the Walraven Fixing Rails and Channels.

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 Fixing Rail and Channel 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 41x21x2,5 mm Walraven Fixing Rail and Channel 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 41x21x2,5 mm were listed above.

Data Sources

The data used for the Walraven Fixing Rail and Channel 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.

SCENARIOS 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 rope was 50 km. Transport of purchased wooden pieces to Walraven was 92 km. Transport from steel coil suppliers to Walraven by following the Bepalingsmethode v1.1, average distance was calculated for the transportation was 274 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, half of the electricity was consumed from solar panel and remaining half from the grid. Therefore the reference - electricity production, photovoltaic, 3kWp slanted-roof installation, multi-Si, panel, mounted | electricity, low voltage | Cutoff,U, Netherlands, Ecoinvent v3.6, Cut-Off for solar panel and 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 and Channels 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 and Channels, 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 (Fixing Rails and Channels) to waste processing.

Module C3 covers the waste processing of Walraven Fixing Rails and Channels, 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 and Channel): 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, ISO14025:2010.

• 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. [Online]. Available:https://milieudatabase.nl/wpcontent/uploads/2022/05/Bepalingsmethode_Milieuprestatie_Bouwwerken_maart_2022_Engels.pdf

• National Environmental Database. 2022. NMD process database 3.5 with Ecoinvent 3.6.

• P. P. a. V. D. M. Lahoti, "Lubrication in cold rolling of steel," Journal of Materials Processing Technology, pp. 4638-4642, 2009.

REMARKS

None.