Environmental
Product
Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:
Walraven Bifix® 412 Clamp pre-galvanized M8 200mm

Provided by:
J. van Walraven Holding B.V.

MRPI® registration:
1.1.00952.2025

Program operator:
Stichting MRPI®
Publisher:
Stichting MRPI®
www.mrpi.nl

Date of first issue:
15-5-2025
Date of this issue:
15-5-2025
Expiry date:
15-5-2030

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MRPI® REGISTRATION

1.1.00952.2025

DATE OF THIS ISSUE

15-5-2025

EXPIRY DATE

15-5-2030

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 ISO14025+EN15804 A2 (+indicators A1). It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPDs 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

PRODUCT

Walraven Bifix® 412 Clamp pre-galvanized M8 200mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

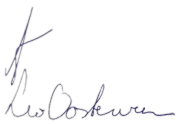
DESCRIPTION OF PRODUCT

Steel two-screw clamp with a quick locking system for secure pipe fastening. Pre-galvanized finish ensures basic corrosion protection.

VISUAL PRODUCT

MORE INFORMATION

https://www.walraven.com/int/products/standard-clamps/

Ing. L. L. Oosterveen MSc. MBA Managing Director MRPI	DEMONSTRATION OF VERIFICATION
	CEN standard EN15804 serves as the core PCR [1]
	Independent verification of the declaration and data according to ISO14025+EN15804 A2 (+indicators A1) Internal: External: X
	Third party verifier: Anne Kees Jeeninga , Advies Lab Vof 
	[1] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

Product Description
The Walraven Bifix® 412 Clamp pre-galvanized M8 (200 mm) is a robust, two-screw steel pipe clamp designed for rapid and secure installation of ventilation and utility pipes. Its quick locking system allows tool-free assembly, ensuring fast and reliable mounting for indoor and sheltered outdoor applications.

Manufacturing Location
This clamp is produced in the Horka, Czech Republic under certified environmental management systems, ensuring consistent quality and compliance with sustainable manufacturing practices.

Manufacturing Process Overview
The clamp body is made from steel for both upper and lower parts. Fastening is provided by hollow pan-headed steel screws (Class 4.8), and the steel is pre-galvanized with zinc coating, accounting for approximately 5% coating losses. The clamp is delivered fully pre-assembled to minimize on-site labor.

Electricity usage references:
Reference: 0569-pro & Elektriciteit, Nederlandse mix, bij consument, per kWh (73% grijs, 27% hernieuwbaar), Database: Ecoinvent v3.6 (Cut-off, NMD), GWP : 0.389 kg CO_2eq/kWh

Reference: market for electricity, low voltage | electricity, low voltage | Czech Republic, Database: Ecoinvent v3.6 (Cut-off, NMD), GWP : 0.936 kg CO2-eq/kWh

Environmental Performance
The product exhibits excellent corrosion resistance, validated through ISO 9227 salt spray testing, and incorporates approximately 50% recycled steel content. No volatile organic compounds (VOCs) are emitted during production, installation, or use. The life cycle of the product has been modeled cradle-to-grave (A1-A5, B1, C1-C4, D) in compliance with EN 15804+A2, using Ecochain Helix v4.3.1, Nationale Milieudatabase v3.8, and Ecoinvent v3.6 datasets.

Installation and Use Phase
The pre-assembled quick-locking design allows for straightforward manual installation. The clamp is suitable for fixed-point mounting of mechanical, utility, and HVAC piping systems, with a reference service life of up to 50 years under standard conditions. The necessary internal transport of Czech Republic to Netherlands has been accounted in the production process of A1-A3.

End-of-Life Considerations
At end-of-life, the clamp can be manually dismantled for recycling. Steel and zinc components are fully recyclable, and the waste treatment and recovery benefits are modeled in Modules C1–C4 and D, with credits for recycled steel included.

Packaging and Transport
The product is shipped in recyclable cardboard packaging. Transport is modeled using EURO 5 or 6 trucks at 50% load efficiency, consistent with EN 15804 standards.

The clamp meets ISO 9227 corrosion protection standards and complies with EN 15804+A2, ISO 14025, and ISO 14040/44 for LCA and EPD reporting.

Name - Half parts	
Steel - Lower part	
Steel - Upper part	
Steel - Hollow pan head screw	

Total Weight	214 g

Component (> 1%)	(kg / %)
Steel (combined)	97,09%

SCOPE AND TYPE

This study involves conducting a comprehensive Life Cycle Assessment (LCA) for the Walraven Clamps, aiming to analyze all life cycle phases from Cradle to Grave (A1–D) using the best available data. The assessment follows the full scope of LCA, meaning the product is evaluated not as a standalone item, but as part of a broader system aggregated with other materials and processed into other products. Consequently, the clamp becomes an integral component of a Declared Unit.

The LCA is performed using the Ecochain Helix software, leveraging background data from authoritative sources such as the Dutch Nationale Milieu Database v3.8 (based on Ecoinvent 3.6) and adhering to the NMD Bepalingsmethode 1.2 (2025) standard. This rigorous methodology ensures a detailed and transparent examination of the environmental impact of the Walraven Clamps across their entire life cycle from the extraction of raw materials (Cradle) through production, installation, and use, to final disposal or recycling (Grave).

The system boundary includes all relevant stages, up to and including Module D (benefits and loads beyond the system boundary). It excludes operational energy use (B6) and water consumption (B7) during the use phase. The environmental impact is declared per one piece of Walraven Clamp, inclusive of ancillary materials, installation, internal transport, and waste processing.

The reference service life is assumed to be 50 years, based on internal product owner data and supported by the European Technical Assessment (ETA) for Walraven Clamps, which confirms a minimum working life of 50 years under appropriate usage and maintenance conditions.

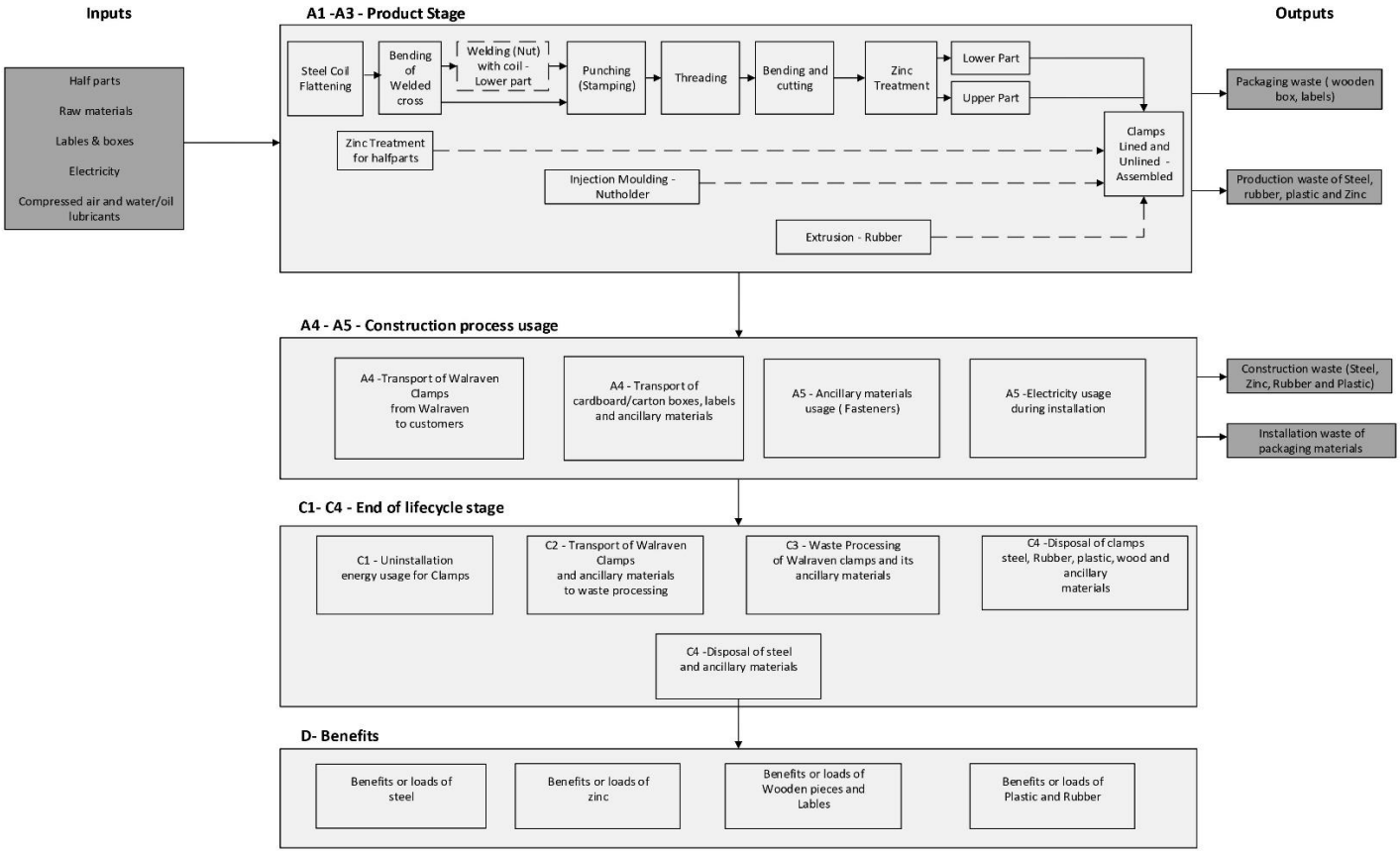
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental impact of excluded materials shall not exceed 5% for any given category.

This comprehensive approach ensures a scientifically sound and holistic understanding of the Walraven Clamp’s environmental footprint throughout its full life cycle.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE 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
A1 -A3 - Product Stage
Outputs
Half parts
Raw materials
Lables & boxes
Electricity
Compressed air and water/oil lubricants
Steel Coil Flattening
Bending of Welded cross
Welding (Nut) with coil - Lower part
Punching (Stamping)
Threading
Bending and cutting
Zinc Treatment
Lower Part
Upper Part
Zinc Treatment for halfparts
Injection Moulding - Nutholder
Extrusion - Rubber
Clamps Lined and Unlined - Assembled
Packaging waste (wooden box, labels)
Production waste of Steel, rubber, plastic and Zinc
A4 - A5 - Construction process usage
A4 -Transport of Walraven Clamps from Walraven to customers
A4 - Transport of cardboard/carton boxes, labels and ancillary materials
A5 - Ancillary materials usage (Fasteners)
A5 -Electricity usage during installation
Construction waste (Steel, Zinc, Rubber and Plastic)
Installation waste of packaging materials
C1- C4 - End of lifecycle stage
C1 - Uninstallation energy usage for Clamps
C2 - Transport of Walraven Clamps and ancillary materials to waste processing
C3 - Waste Processing of Walraven clamps and its ancillary materials
C4 -Disposal of clamps steel, Rubber, plastic, wood and ancillary materials
C4 -Disposal of steel and ancillary materials
D- Benefits
Benefits or loads of steel
Benefits or loads of zinc
Benefits or loads of Wooden pieces and Lables
Benefits or loads of Plastic and Rubber

REPRESENTATIVENESS

The aggregation was done by choosing the reference product as Walraven Bifix® 412 Clamp pre-galvanized M8 200mm. The remaining products which are aggregated in the same group by following the 20% allocation and worst case scenario as per the EN 15804+A2 & NMD Bepalingsmethode v1.2 (2025) are listed below:

Walraven 434 Clamp zinc plated M10 PE-pipe 160mm
Walraven Two-Screw Clamp Stainless M8/10 199-204mm
Walraven 2S Clamp zinc plated M8/10 163-172mm
Walraven 434 Clamp zinc plated M10 PE-pipe 75mm
Walraven 434 Clamp stainless steel M10 PE-pipe 63mm
Walraven Bifix® 412 Clamp pre-galvanized M8 200mm
Walraven Bifix® 300 Clamp Stainless M10 212-219mm
Walraven 434 Clamp zinc plated G1/2" PE-Pipe 125mm
Walraven Bifix® 300 Clamp Stainless M10 155mm
Walraven Bifix® 300 Clamp Stainless M10 139-144mm
Walraven HD500 Clamp black M8/10 25-30mm
Walraven 434 Clamp zinc plated M10 PE-pipe 125mm
Walraven 434 Clamp zinc plated G1/2" PE-Pipe 63mm
Walraven Bifix® 412 Clamp pre-galvanized M8 180mm
Walraven 434 Clamp stainless steel M10 PE-pipe 50mm
Walraven Two-Screw Clamp Stainless M8/10 159-163mm
Walraven Bifix® 300 Clamp Stainless M10 122-127mm
Walraven 434 Clamp zinc plated G1/2" PE-Pipe 110mm
Walraven 434 Clamp zinc plated M10 PE-pipe 63mm
Walraven 434 Clamp stainless steel M10 PE-pipe 56mm
Walraven Bifix® 412 Clamp pre-galvanized M8 160mm
Walraven 434 Clamp zinc plated G1/2" PE-Pipe 56mm
Walraven Bifix® 300 Clamp Stainless M8 110-118mm
Walraven Hinged Pipe Clamp 400 square BUP 100mm
Walraven 434 Clamp stainless steel M10 PE-pipe 40mm
Walraven Bifix® 412 Clamp pre-galvanized M8 150mm
Walraven HD500 Clamp BUP M10 40-45mm
Walraven Bifix® 300 Clamp Stainless M10 106-111mm
Walraven Bifix® 300 Clamp Stainless M10 110-118mm
Walraven HD500 Clamp BUP 1/2" 31-36mm
Walraven Two-Screw Clamp Stainless M8/10 124-131mm

ENVIRONMENTAL IMPACT per functional unit or declared unit (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.	8,56E-03	7,12E-07	4,33E-06	8,56E-03	1,10E-07	4,28E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,83E-07	6,46E-07	5,75E-10	-1,19E-07
ADPF	MJ	1,27E+01	4,26E-01	5,67E+00	1,88E+01	6,57E-02	8,49E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,09E-01	1,57E-01	1,75E-03	-2,12E+00
GWP	kg CO2 eq.	8,61E-01	2,79E-02	4,21E-01	1,31E+00	4,30E-03	5,84E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,16E-03	1,15E-02	6,17E-05	-1,65E-01
ODP	kg CFC11 eq.	6,05E-08	4,95E-09	2,37E-08	8,92E-08	7,62E-10	4,35E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,27E-09	1,44E-09	2,05E-11	-5,74E-09
POCP	kg ethene eq.	7,98E-04	1,68E-05	-1,21E-04	6,94E-04	2,59E-06	1,76E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,32E-06	1,01E-05	6,57E-08	-3,58E-04
AP	kg SO2 eq.	4,94E-03	1,23E-04	1,42E-03	6,49E-03	1,89E-05	3,05E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,15E-05	1,13E-04	4,51E-07	-5,58E-04
EP	kg (PO4) 3 eq.	7,10E-04	2,41E-05	3,03E-04	1,04E-03	3,71E-06	4,98E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,18E-06	1,44E-05	8,70E-08	-6,62E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	1,71E+00	1,17E-02	-1,65E-02	1,70E+00	1,81E-03	8,08E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,01E-03	1,40E-02	2,79E-05	-1,03E-01
FAETP	kg DCB eq.	2,78E-02	3,43E-04	2,02E-03	3,01E-02	5,28E-05	1,59E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,80E-05	2,60E-04	6,62E-07	1,28E-03
MAETP	kg DCB eq.	5,28E+01	1,23E+00	1,03E+01	6,42E+01	1,90E-01	3,35E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,17E-01	1,13E+00	2,37E-03	1,07E+00
TETP	kg DCB eq.	1,01E-02	4,15E-05	2,03E-03	1,22E-02	6,39E-06	1,04E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,07E-05	4,35E-05	7,00E-08	8,61E-03
ECI	euro	2,33E-01	3,36E-03	2,94E-02	2,66E-01	5,18E-04	1,25E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,63E-04	2,57E-03	8,71E-06	-2,06E-02
ADPF	kg Sb eq.	6,09E-03	2,05E-04	2,73E-03	9,02E-03	3,16E-05	4,08E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,26E-05	7,57E-05	8,40E-07	-1,02E-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

ENVIRONMENTAL 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.	8,87E-01	2,81E-02	4,18E-01	1,33E+00	4,34E-03	5,90E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,44E-03	1,17E-02	6,29E-05	-1,77E-01
GWP-fossil	kg CO2 eq.	8,82E-01	2,81E-02	4,17E-01	1,33E+00	4,33E-03	5,87E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,22E-03	1,16E-02	6,28E-05	-1,77E-01
GWP-biogenic	kg CO2 eq.	3,81E-03	1,05E-05	6,73E-04	4,49E-03	1,62E-06	2,39E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	-4,78E-03	4,36E-05	3,67E-08	0,00E+00
GWP-luluc	kg CO2 eq.	1,65E-03	1,03E-05	4,35E-04	2,10E-03	1,59E-06	1,12E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,65E-06	1,30E-05	1,75E-08	1,31E-04
ODP	kg CFC11 eq.	6,15E-08	6,20E-09	1,85E-08	8,62E-08	9,56E-10	4,31E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,59E-09	1,67E-09	2,59E-11	-4,32E-09
AP	mol H+ eq.	6,10E-03	1,63E-04	1,70E-03	7,96E-03	2,51E-05	3,74E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,19E-05	1,41E-04	5,97E-07	-6,82E-04
EP-fresh water	kg P eq.	6,95E-05	2,84E-07	7,01E-05	1,40E-04	4,37E-08	6,73E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,28E-08	7,93E-07	7,04E-10	-6,24E-06
EP-marine	kg N eq.	1,30E-03	5,74E-05	2,39E-04	1,59E-03	8,85E-06	7,60E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,48E-05	3,11E-05	2,05E-07	-1,27E-04
EP-terrestrial	mol N eq.	1,43E-02	6,33E-04	2,91E-03	1,79E-02	9,76E-05	8,51E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,63E-04	3,61E-04	2,26E-06	-1,48E-03
POCP	kg NMVOC eq.	4,63E-03	1,81E-04	3,78E-04	5,19E-03	2,79E-05	2,18E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,64E-05	9,87E-05	6,57E-07	-1,00E-03
ADP-minerals & metals	kg Sb eq.	8,56E-03	7,12E-07	4,33E-06	8,56E-03	1,10E-07	4,28E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,83E-07	6,46E-07	5,75E-10	-1,19E-07
ADP-fossil	MJ, net calorific value	1,14E+01	4,24E-01	6,13E+00	1,79E+01	6,53E-02	8,51E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,09E-01	1,61E-01	1,76E-03	-1,23E+00
WDP	m3 world eq. Deprived	5,63E-01	1,52E-03	9,11E-02	6,56E-01	2,34E-04	3,12E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,90E-04	1,62E-03	7,88E-05	-3,37E-02

GWP-total	=	Global Warming Potential total
GWP-fossil	=	Global Warming Potential fossil fuels
GWP-biogenic	=	Global Warming Potential biogenictotal
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 [1]
ADP-fossil	=	Abiotic Depletion for fossil resources potential [1]
WDP	=	Water (user) deprivation potential, deprivation-weighted water consumption [1]

Disclaimer [1]:

- 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 experience with the indicator.

ENVIRONMENTAL 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 inci-dence	5,98E-08	2,52E-09	-6,73E-09	5,56E-08	3,89E-10	2,41E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,48E-10	1,77E-09	1,16E-11	-1,02E-08
IRP	kBq U235 eq.	5,36E-02	1,78E-03	3,45E-02	8,99E-02	2,74E-04	4,72E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,56E-04	8,04E-04	7,21E-06	3,02E-03
ETP-fw	CTUe	9,79E+01	3,78E-01	3,17E-01	9,86E+01	5,83E-02	4,68E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,71E-02	6,94E-01	1,14E-03	-5,93E+00
HTP-c	CTUh	6,01E-09	1,23E-11	-5,83E-10	5,43E-09	1,89E-12	2,72E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,15E-12	1,69E-11	2,63E-14	-2,26E-11
HTP-nc	CTUh	1,03E-07	4,13E-10	1,62E-10	1,03E-07	6,37E-11	6,92E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,06E-10	8,04E-10	8,10E-13	3,43E-08
SQP	-	4,53E+00	3,68E-01	1,67E+00	6,57E+00	5,67E-02	3,39E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,44E-02	3,25E-01	3,68E-03	-2,73E-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, cancer [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 experience with the indicator.

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

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	1,12E-03	1,07E-06	-7,74E-06	1,11E-03	1,66E-07	5,44E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,76E-07	4,87E-07	2,63E-09	-2,12E-05
NHWD	kg	2,52E-01	2,69E-02	3,37E-02	3,13E-01	4,14E-03	1,61E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,91E-03	4,72E-03	1,19E-02	-1,73E-02
RWD	kg	4,22E-05	2,78E-06	2,89E-05	7,39E-05	4,29E-07	3,85E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,15E-07	9,56E-07	1,15E-08	1,05E-06
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	2,64E-04	2,64E-04	0,00E+00	1,32E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	2,27E-01	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	1,60E-05	1,60E-05	0,00E+00	8,01E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	9,23E-04	9,23E-04	0,00E+00	4,61E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
ETE	MJ	0,00E+00	0,00E+00	5,37E-04	5,37E-04	0,00E+00	2,68E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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

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

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	1,24E+00	5,31E-03	6,87E-01	1,94E+00	8,18E-04	1,00E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,36E-03	2,53E-02	1,42E-05	3,59E-02
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,24E+00	5,31E-03	6,87E-01	1,94E+00	8,18E-04	1,00E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,36E-03	2,53E-02	1,42E-05	3,59E-02
PENRE	MJ	1,21E+01	4,50E-01	6,61E+00	1,91E+01	6,94E-02	9,11E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,16E-01	1,71E-01	1,87E-03	-1,28E+00
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,21E+01	4,50E-01	6,61E+00	1,91E+01	6,94E-02	9,11E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,16E-01	1,71E-01	1,87E-03	-1,28E+00
SM	kg	1,03E-01	0,00E+00	7,72E-05	1,03E-01	0,00E+00	3,86E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NSRF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,69E-02	5,16E-05	1,14E-02	2,84E-02	7,96E-06	1,39E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,33E-05	7,66E-05	1,88E-06	-6,39E-04

PERE = Use of renewable primary energy excluding renewable primary energy 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 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
NSRF = Use of non-renewable secondary fuels
FW = Use of net fresh water

BIOGENIC CARBON CONTENT per functional unit or declared unit (A1 and A2)

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

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

CALCULATION RULES

Data flows for the Walraven Bifix® 412 Clamp pre-galvanized M8 200mm have been modeled to reflect real-world operations as accurately as possible. Primary data from Walraven's Czech production facility was used for all available processes. Where supplier-specific information was unavailable, representative datasets were sourced from verified databases, including the Nationale Milieudatabase v3.8 and Ecoinvent 3.6.

For Module A1, data on material composition and raw materials was obtained directly from the manufacturer. Module A2 incorporates actual transport distances and logistics from suppliers to the production site, while Module A3 covers measured energy consumption, material waste, and emissions during the 2023/2024 production year.

The dataset is representative of production processes for 2023/2024 and was developed in accordance with EN 15804+A2:2019, ISO 14040, ISO 14044, ISO 14025, and the Dutch NMD Bepalingsmethode v1.2 (2025). Modelling and calculations were conducted using Ecochain Helix version 4.3.1.

The life cycle stages included in the assessment are A1–A3 for raw material extraction, transport, and manufacturing, A4–A5 for transport to site and installation, C1–C4 for end-of-life deconstruction, waste processing, and disposal, and Module D for potential environmental benefits via recycling or energy recovery.

All relevant material and energy flows, emissions, and outputs have been included. Shared manufacturing inputs were allocated using mass-based allocation. No secondary materials were used during production, and the study adheres to cut-off criteria, with excluded flows accounting for less than 5% of mass or energy per module.

Primary data collected from Walraven covers energy use, emissions, material composition, and transport distances. For upstream and downstream processes, such as zinc coating, transport to treatment facilities, and final waste processing, representative background datasets from Ecoinvent 3.6 and NMD v3.8 were applied, ensuring methodological consistency and compliance with EN15804 standards.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Modules A1 to A3 cover the life cycle stages beginning with raw material extraction and upstream processing. For Module A1, all relevant raw and auxiliary materials used in manufacturing the Walraven Bifix® 412 Clamp pre-galvanized M8 200mm clamp were included, based on 2023/2024 production data. The primary components of this product include steel and a zinc coating. Background data was sourced from the Nationale Milieudatabase (NMD) v3.8 and Ecoinvent v3.6, with steel modeled using an approximate market composition of 57% primary and 43% secondary content. Zinc processing was included via standard coating datasets.

Module A2 addresses the transportation of materials to the Walraven production site in the Czech Republic. This includes truck transport over varying distances and 100 km internal transport for zinc coating. A 50% load factor (loaded inbound, empty return) was applied. Transport emissions are calculated using EN 15804+A2 conformant datasets from NMD and Ecoinvent.

Module A3 covers the clamp's manufacturing process at the Czech site, using 2023/2024 primary operational data. The environmental impact assessment includes energy consumption (electricity from Czech grid mix and renewable sources), packaging, production losses, and auxiliary inputs such as lubricating oil. Steel scrap and zinc treatment processes were included, with scrap transported for recycling. Energy use and waste were allocated proportionally across all site processes. Capital goods were excluded per the <5% cutoff rule.

Module A4 reflects the distribution of the finished clamp from factory to site, using a standard transport distance of 150 km in line with Bepalingsmethode v1.2. The transport was modeled using a freight truck with a 50% utilization rate and generic truck references from NMD v3.8 and Ecoinvent 3.6.

Module A5 represents the installation phase. A 5% material loss was assumed due to manual handling. No additional energy is required for installation. Material losses steel and zinc are assumed to be transported 100 km to processing or landfill facilities. This phase also includes modeling for packaging disposal. End-of-life values are taken from Bepalingsmethode v1.2 (2025).

End-of-Life Scenario Fixed Values used:

Material	Leave	Landfill	Incineration (AVI)	Recycling	Reuse
Steel, Zinc	0%	5%	0%	95%	0%
Rubber/Plastic	0%	0%	100%	0%	0%

Module C1 assumes that the Walraven Bifix® 412 Clamp pre-galvanized M8 200mm is manually deconstructed, requiring no energy input. Module C2 models the transportation of waste materials following deconstruction, with steel and zinc transported 50 km to recycling facilities, while any additional materials would be sent 100 km to incineration. Emissions from transport are calculated using standard NMD v3.8 and Ecoinvent v3.6 datasets.

Module C3 addresses waste processing. Steel and zinc are assumed to be 100% sorted and recycled, with emissions modeled using references such as 0315-reC&Sorteren en persen oud ijzer for steel and 0253-sto&Stort staal for zinc. Any incidental plastics would be incinerated with energy recovery using reference 0264-avC&Verbranden kunststoffen. Module C4 captures final disposal, with 5% of steel and zinc directed to landfill, while other materials are fully recycled or incinerated as applicable.

Module D quantifies environmental benefits beyond the system boundary. Recycled steel receives a 52% substitution credit, based on 95% recycling efficiency minus 43% existing secondary content, while zinc is modeled with a 95% recycling benefit. As the clamp contains no rubber or plastic components, energy recovery from incineration does not apply.

This modeling follows EN 15804+A2:2019 + AC:2021 and the Dutch Bepalingsmethode v1.2 (2025), ensuring full compliance with European and national LCA reporting standards and using verified datasets for reliable, consistent environmental impact assessment.

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

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