Environmental
Product
Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:
Walraven Bifix® Clamp Unlined M8/10 - 48-52mm

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

MRPI® registration:
1.1.00944.2025

Program operator:
Stichting MRPI®
Publisher:
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MRPI® REGISTRATION

1.1.00944.2025

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® Clamp Unlined M8/10 - 48-52mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

DESCRIPTION OF PRODUCT

The Walraven Bifix® Clamps Unlined M8/10 - 48–52mm is a robust, two-screw pipe clamp designed for securing steel, copper, and plastic pipes (Ø 48–52 mm) in indoor and outdoor settings. Featuring a quick locking system and made of corrosion-resistant steel, it is part of the Walraven BIS UltraProtect® 1000 system, offering excellent durability and resistance to harsh environments.

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

The Walraven Bifix® G2 Clamp BUP M8/10 48–52mm is a durable two-screw clamp designed for securing steel, copper, and multilayer pipes (Ø 48–52 mm) in both indoor and outdoor installations. Featuring a quick locking system and corrosion-resistant steel, it is part of the Walraven BIS UltraProtect® 1000 system and is engineered for long-term reliability in demanding environments.

Manufacturing Process:
Steel Coil Processing: Precision cut steel parts ensure structural strength and dimensional consistency and Manufacturing in Mijdrecht, Netherlands.
Stamping & Bending: The clamp body is shaped with high accuracy to fit medium-diameter pipes securely.
Threading & Welding: A resistance welded M8/10 nut is fixed into position to ensure stable and flexible mounting options.
Surface Treatment: The clamp is treated with BIS UltraProtect® 1000 (BUP 1000) coating, achieving 1000-hour salt spray resistance (ISO 9227:2012) for long-term protection against corrosion, including in C4 rated environments.
Final Assembly: The clamp includes pre-installed screws, a nut holder (PP), and an anti-loss washer (POM), making it ready for quick and easy installation.

Electricity usage references:
Reference: 0569-pro & Elektriciteit, Nederlandse mix, bij consument, per kWh (73% grijs, 27% hernieuwbaar), Database: Ecoinvent v3.6 (Cut-off, NMD+EI), GWP : 0.389 kg CO_2-eq/kWh

Reference: 0573-pro & Elektriciteit, hernieuwbaar, uit PV, bij consument, per kWh, Database: Ecoinvent v3.6 (Cut-off, NMD+EI), GWP : 0.095 kg CO2-eq /kWh

Environmental and Installation Features:
Corrosion Protection: The BUP 1000 finish eliminates the need for post-installation coatings, reducing maintenance needs and environmental footprint.

Name - Half parts	
Steel - Lower part	
Steel - Upper part	
Steel - Hollow pan head screw	
Steel - Nut	
Plastic - Nut holder	
Plastic - Anti-loss washer	

Total Weight	63 g

Component (> 1%)	(%)
Steel (combined)	97,50%

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 Bifix® G2 Clamps, which confirms a minimum working life of 50 years under appropriate usage and maintenance conditions.

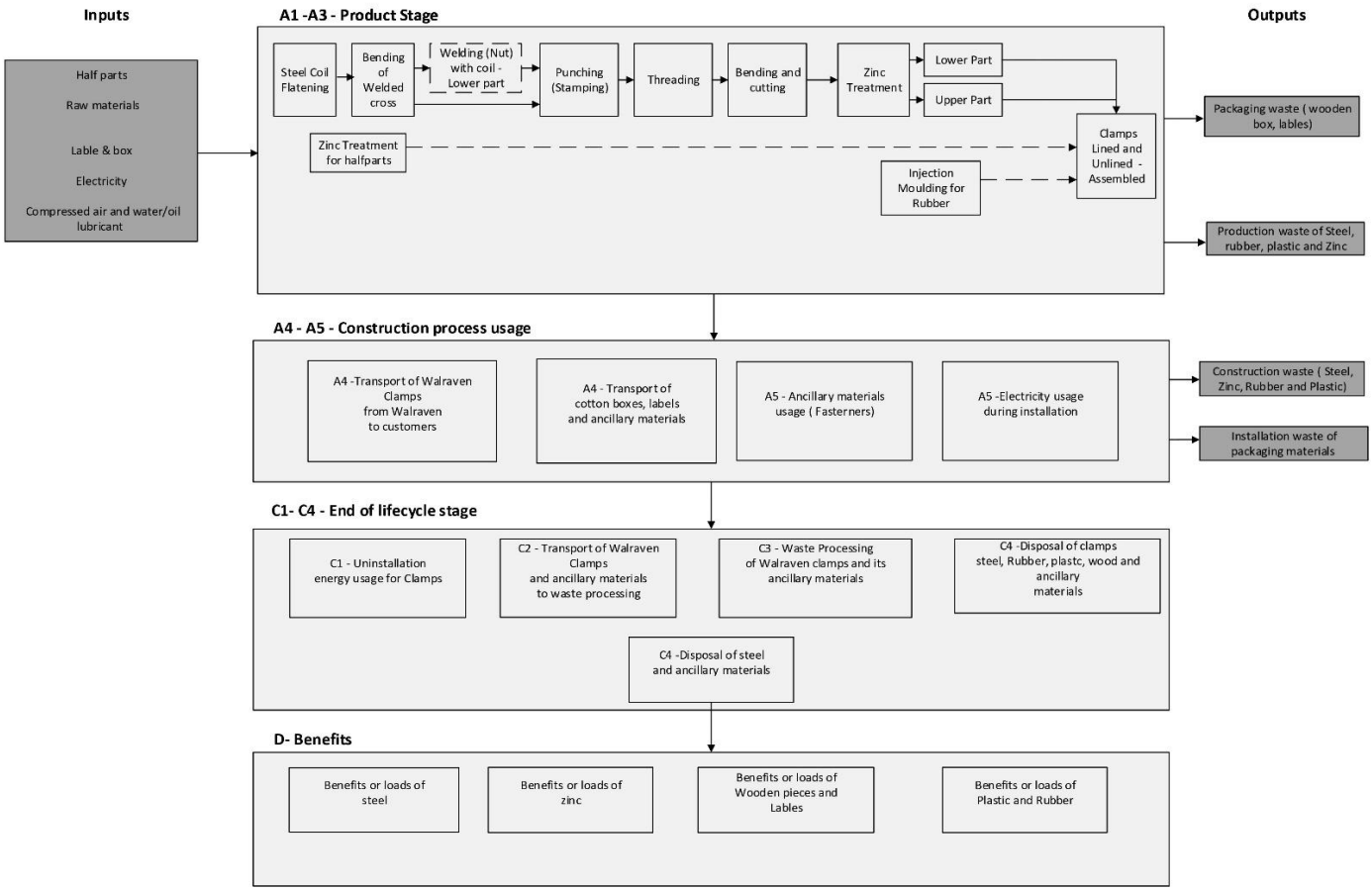
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental 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
Lable & box
Electricity
Compressed air and water/oil lubricant
Steel Coil Flatening
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 for Rubber
Clamps Lined and Unlined - Assembled
Packaging waste (wooden box, lables)
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 cotton boxes, labels and ancillary materials
A5 - Ancillary materials usage (Fasterners)
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, plastc, 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® G2 Clamp BUP M8/10 48-52mm. The remaining products which are aggregated in the same group by following the 20% allocation and worst case senario as per the EN 15804+A2 & NMD Bepalingsmethode v1.2 (2025) are listed below:

Walraven 3000 Clamp zinc plated M8 50mm
Walraven 4000 Clamp M8 BUP 50mm
Walraven 4000 Clamp M8 zinc plated 50mm
Walraven Bifix® G2 Clamp BUP M8/10 54-58mm
Walraven Sprinkler Clamp TA41 FM/UL M10 1 1/2 (DN40)
Walraven Duplo KS zinc plated PP white 22mm
Walraven Bifix® G2 Clamp BUP M8/10 48-52mm
Walraven 4000 Clamp M8 BUP 40mm
Walraven 3000 Clamp zinc plated M8 40mm
Walraven 4000 Clamp M8 zinc plated 40mm
Walraven Bifix® G2 Clamp BUP M8/10 40-45mm
Walraven Duplo KS zinc plated PP white 15mm
Walraven Sprinkler Clamp TA41 FM/UL M10 1 1/4 (DN32)
Walraven 3000 Clamp zinc plated M8 32mm
Walraven Bifix® G2 Clamp BUP M8/10 36-39mm
Walraven Bifix® G2 Clamp BUP M8/10 31-35mm
Walraven Sprinkler Clamp TA41 FM/UL M10 1" (DN25)
Walraven Bifix® G2 Clamp BUP M8/10 25-28mm
Walraven Bifix® G2 Clamp BUP M8/10 20-23mm
Walraven Bifix® G2 Clamp BUP M8/10 15-19mm
Walraven Bifix® G2 Clamp BUP M8/10 10-14mm
Walraven Sprinkler Clamp TA41 FM/UL M10 3/4" (DN20)
Walraven Sprinkler Clamp TA41 FM/UL M10 1/2" (DN15)

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.	1,51E-03	1,34E-06	4,28E-07	1,51E-03	3,23E-08	7,08E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,39E-08	9,50E-08	1,69E-10	-9,25E-05
ADPF	MJ	3,19E+00	8,03E-01	4,29E-01	4,42E+00	1,93E-02	1,91E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,22E-02	2,38E-02	5,14E-04	-6,80E-01
GWP	kg CO2 eq.	2,16E-01	5,26E-02	2,34E-02	2,92E-01	1,26E-03	1,23E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,11E-03	2,94E-03	1,82E-05	-5,14E-02
ODP	kg CFC11 eq.	1,52E-08	9,33E-09	2,27E-09	2,68E-08	2,24E-10	1,29E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,74E-10	2,47E-10	6,04E-12	-1,93E-09
POCP	kg ethene eq.	2,14E-04	3,20E-05	2,07E-07	2,47E-04	7,63E-07	7,29E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,27E-06	1,51E-06	1,93E-08	-1,04E-04
AP	kg SO2 eq.	1,14E-03	2,40E-04	3,97E-05	1,42E-03	5,56E-06	6,29E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,27E-06	1,68E-05	1,33E-07	-1,90E-04
EP	kg (PO4) 3 eq.	1,64E-04	4,62E-05	7,09E-06	2,17E-04	1,09E-06	9,95E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,82E-06	2,16E-06	2,56E-08	-2,33E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	4,59E-01	2,22E-02	2,16E-03	4,83E-01	5,32E-04	2,27E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,87E-04	2,10E-03	8,46E-06	-3,24E-02
FAETP	kg DCB eq.	5,96E-03	6,45E-04	8,59E-05	6,69E-03	1,55E-05	3,46E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,59E-05	4,23E-05	3,44E-07	1,48E-04
MAETP	kg DCB eq.	1,14E+01	2,33E+00	3,41E-01	1,41E+01	5,59E-02	7,17E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,32E-02	1,77E-01	7,18E-04	-6,98E-02
TETP	kg DCB eq.	2,85E-03	7,84E-05	1,82E-04	3,11E-03	1,88E-06	2,78E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,14E-06	6,49E-06	2,12E-08	2,45E-03
ECI	euro	6,05E-02	6,39E-03	1,67E-03	6,86E-02	1,52E-04	3,14E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,54E-04	4,47E-04	2,59E-06	-6,59E-03
ADPF	kg Sb eq.	1,53E-03	3,86E-04	2,06E-04	2,13E-03	9,30E-06	9,18E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,55E-05	1,14E-05	2,47E-07	-3,27E-04

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.	2,23E-01	5,31E-02	-3,41E-03	2,72E-01	1,28E-03	1,12E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,13E-03	2,97E-03	1,86E-05	-5,47E-02
GWP-fossil	kg CO2 eq.	2,22E-01	5,31E-02	2,34E-02	2,98E-01	1,28E-03	1,25E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,13E-03	2,96E-03	1,85E-05	-5,48E-02
GWP-biogenic	kg CO2 eq.	7,97E-04	1,97E-05	-5,00E-07	8,16E-04	4,76E-07	4,30E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,93E-07	8,60E-04	1,12E-08	0,00E+00
GWP-luluc	kg CO2 eq.	4,06E-04	1,96E-05	-5,55E-07	4,25E-04	4,67E-07	2,27E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,79E-07	1,98E-06	5,17E-09	2,52E-05
ODP	kg CFC11 eq.	1,54E-08	1,17E-08	2,47E-09	2,95E-08	2,81E-10	1,45E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,69E-10	2,80E-10	7,60E-12	-1,52E-09
AP	mol H+ eq.	1,40E-03	3,18E-04	5,35E-05	1,77E-03	7,40E-06	7,90E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,23E-05	2,10E-05	1,76E-07	-2,33E-04
EP-fresh water	kg PO4 eq.	1,64E-05	5,33E-07	4,55E-07	1,73E-05	1,29E-08	7,65E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,14E-08	1,18E-07	2,09E-10	-2,21E-06
EP-marine	kg N eq.	2,93E-04	1,11E-04	1,09E-05	4,14E-04	2,61E-06	1,91E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,34E-06	4,65E-06	6,05E-08	-4,44E-05
EP-terrestrial	mol N eq.	3,22E-03	1,22E-03	1,65E-04	4,61E-03	2,87E-05	2,11E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,79E-05	5,39E-05	6,67E-07	-5,15E-04
POCP	kg NMVOC eq.	1,10E-03	3,48E-04	2,68E-05	1,47E-03	8,20E-06	6,00E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,37E-05	1,47E-05	1,94E-07	-3,11E-04
ADP-minerals & metals	kg Sb eq.	1,51E-03	1,34E-06	4,28E-07	1,51E-03	3,23E-08	7,08E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,39E-08	9,50E-08	1,69E-10	-9,25E-05
ADP-fossil	MJ, net calorific value	2,83E+00	7,99E-01	3,98E-01	4,03E+00	1,92E-02	1,84E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,21E-02	2,42E-02	5,18E-04	-4,29E-01
WDP	m3 world eq. Deprived	1,25E-01	2,85E-03	5,38E-03	1,34E-01	6,88E-05	6,01E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,15E-04	2,98E-04	2,26E-05	-1,39E-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	1,56E-08	4,74E-09	8,22E-11	2,04E-08	1,15E-10	8,96E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,91E-10	2,60E-10	3,41E-12	-3,08E-09
IRP	kBq U235 eq.	1,21E-02	3,35E-03	6,61E-04	1,61E-02	8,06E-05	8,44E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,34E-04	1,20E-04	2,14E-06	4,58E-04
ETP-fw	CTUe	1,96E+01	7,12E-01	2,13E-01	2,05E+01	1,72E-02	9,08E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,86E-02	1,16E-01	3,99E-04	-2,53E+00
HTP-c	CTUh	1,51E-09	2,32E-11	-1,12E-11	1,52E-09	5,56E-13	7,48E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,27E-13	2,68E-12	8,23E-15	-2,71E-11
HTP-nc	CTUh	2,32E-08	7,77E-10	1,58E-10	2,42E-08	1,88E-11	1,68E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,13E-11	1,21E-10	2,89E-13	9,18E-09
SQP	-	1,04E+00	6,90E-01	5,03E-01	2,23E+00	1,67E-02	1,11E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,78E-02	4,72E-02	1,09E-03	-1,06E-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	2,00E-04	2,02E-06	1,56E-06	2,03E-04	4,87E-08	9,26E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,12E-08	7,21E-08	7,69E-10	-1,80E-05
NHWD	kg	6,65E-02	5,04E-02	7,55E-04	1,18E-01	1,22E-03	5,98E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,03E-03	7,01E-04	3,47E-03	-5,48E-03
RWD	kg	9,90E-06	5,25E-06	6,30E-07	1,58E-05	1,26E-07	8,14E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,11E-07	1,41E-07	3,40E-09	1,12E-08
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	1,51E-04	1,51E-04	0,00E+00	7,55E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	6,48E-02	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	5,31E-06	5,31E-06	0,00E+00	2,65E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	4,80E-04	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	3,36E-04	3,36E-04	0,00E+00	1,68E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,60E-03
ETE	MJ	0,00E+00	0,00E+00	1,96E-04	1,96E-04	0,00E+00	9,78E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,09E-03

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	2,95E-01	9,98E-03	1,58E-01	4,64E-01	2,41E-04	2,35E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,01E-04	3,76E-03	4,92E-06	2,82E-03
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	2,95E-01	9,98E-03	1,58E-01	4,64E-01	2,41E-04	2,35E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,01E-04	3,76E-03	4,92E-06	2,82E-03
PENRE	MJ	3,01E+00	8,49E-01	4,35E-01	4,29E+00	2,04E-02	1,96E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,40E-02	2,57E-02	5,50E-04	-4,48E-01
PENRM	MJ	1,16E-02	0,00E+00	0,00E+00	1,16E-02	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	3,02E+00	8,49E-01	4,35E-01	4,30E+00	2,04E-02	1,96E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,40E-02	2,57E-02	5,50E-04	-4,48E-01
SM	kg	2,93E-02	0,00E+00	4,58E-05	2,94E-02	0,00E+00	2,29E-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	3,79E-03	9,70E-05	1,77E-04	4,07E-03	2,34E-06	1,89E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,90E-06	1,29E-05	5,55E-07	-3,03E-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 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 2023 and 2024.

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 3.6 and Nationale Milieu Database v3.8 (NMD) database have been selected for the various materials and resources used for the Walraven Clamps.

The end-of-life processing for phase C2-C4 + D follows standardized scenarios outlined in NEN-EN15804+A2 (version 1.2, January 2025), which is the Environmental Performance Assessment Method for Construction Works.

In this case of Walraven Clamps, 20% allocation and worst case senario methods were used for the grouping by choosing the reference products following the Bepalingsmethode v1.2 (2025).

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 v1.2 (2025). Due to the different products involved in this modelling, by choosing the worst-case scenario of taking the reference value of Walraven Bifix® Clamps Unlined M8/10 - 48-52mm 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 v1.2 (2025). The remaining dimensions were grouped along with Walraven Bifix® Clamps Unlined M8/10 - 48-52mm are listed above.

Data Sources:
The data used for the Walraven clamps 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 3.8 and Ecoinvent 3.6 databases were chosen for the LCA modelling.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Modules A1 to A3 represent the upstream and core manufacturing life cycle stages. Module A1 includes the extraction and processing of raw and auxiliary materials such as packaging and lubricants. For the Walraven Bifix® Clamps Unlined M8/10 48–52mm, modeling is based on the actual 2023–2024 bill of materials. The key inputs include various steel grades, polypropylene (PP) plastic, and zinc coatings. Environmental data was sourced from the National Milieudatabase (NMD) v3.8 and Ecoinvent v3.6, with representative generic datasets used where specific values were unavailable. Steel content was modeled with 57% primary and 43% secondary input, aligned with NMD assumptions.

Module A2 evaluates the transport of raw materials to the Walraven production facility in Mijdrecht. All transport modeling is performed in accordance with EN 15804:2012+A2:2019/AC:2021, using datasets from NMD v3.8 and Ecoinvent 3.6, assuming a 50% average truck load factor, representing a full trip to site and an empty return. Key transport distances for this product include 1,600 km by truck for PP plastic, for steel components depending on the supplier, with certain steel parts requiring an additional 100 km to the zinc treatment facility. Transport associated with zinc coating processes is modeled over 100 km. All road transport emissions are calculated using the dataset 0001-tra&Transport, vrachtwagen (freight, lorry, unspecified {GLO}) from NMD v3.8 and Ecoinvent 3.6.

Module A3 models production at the Walraven Mijdrecht facility. This includes electricity use, fuel inputs, packaging, and production waste, all based on 2023–2024 operational data. Electricity was supplied via a mixed-energy profile, combining Dutch grid power and on-site solar generation. Additional electricity consumption occurred due to zinc treatment.

Production waste consisted primarily of steel scrap, of which a significant share was recycled. Allocation of this material flow was calculated based on the Mijdrecht site's share of overall clamp production. Transport of waste materials to processing facilities was also included. Lubricating oil was used as an auxiliary material in manufacturing.Capital goods were excluded from modeling in line with the EN 15804+A2 cutoff rule, as their total impact is below 5% of the environmental footprint.

Module A4 evaluates distribution of the finished clamp from Mijdrecht to installation sites. A standard transport distance of 150 km was used, per Bepalingsmethode v1.2 (2025). A 50% load factor (full load to site, empty return) was applied. Road transport emissions were modeled using the same NMD v3.8 freight truck dataset.

Module A5 includes installation related losses and waste handling. A 5% material loss was applied to steel and plastic, reflecting manual installation losses. No energy was modeled for installation activities. Waste transport distances were:Steel: 100 km to landfill and Plastic: 100 km to incineration (AVI)

Modeling used the following fixed end-of-life scenario fractions:

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

Module C1 considers the manual deconstruction of the clamp at the end of its service life. No energy consumption is modeled for this stage.

Module C2 covers the transport of post-use materials to their respective waste processing facilities. Steel and zinc are transported 50 km to recycling or landfill sites, while plastic is transported 100 km to AVI incineration plants. Transport emissions are modeled using the freight truck dataset from NMD v3.8 and Ecoinvent v3.6.

Module C3 addresses end-of-life waste treatment. Steel and zinc are assumed to be fully recycled, while plastic is fully incinerated with energy recovery at AVI facilities. Emission reference datasets include 0264-avC&Verbranden kunststoffen (28.67 MJ/kg) for plastic, 0315-reC&Sorteren en persen oud ijzer for steel, and zinc is included in mixed steel processing. All datasets are sourced from NMD v3.8 and Ecoinvent v3.6.

Module C4 considers final disposal. A residual 5% of steel and zinc is assumed to be landfilled, using 0253-sto&Stort staal for steel and 0248-sto&Stort koper, lood, verzinkt staal, zink for zinc.

Module D quantifies environmental benefits beyond the system boundary. Steel recycling is credited with a 52% substitution benefit, reflecting a 95% recycling rate minus 43% secondary content. Zinc recycling is modeled with a 95% efficiency. Plastic incineration is assumed to deliver 100% energy substitution through recovered energy displacing fossil-based electricity.

This life cycle assessment is prepared in accordance with EN 15804:2012+A2:2019/AC:2021, following the modular EPD structure and methodology of Bepalingsmethode v1.2 (2025). All data are verified and modeled using NMD v3.8 and Ecoinvent v3.6, consistent with current Dutch and international best practices for construction product environmental declarations.

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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