Environmental
Product
Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:
Walraven Bifix® G2 Clamp BUP EPDM M8 40-45mm

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

MRPI® registration:
1.1.00940.2025

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Stichting MRPI®
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MRPI® REGISTRATION

1.1.00940.2025

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® G2 Clamp BUP EPDM M8 40-45mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

DESCRIPTION OF PRODUCT

The Walraven Bifix® G2 Clamp BUP EPDM M8 40–45mm is a two-screw, pre-assembled pipe clamp designed for steel, copper, cast iron, and multilayer pipes. It features a quick-locking system for one-handed installation, EPDM rubber lining for noise insulation, and is corrosion-resistant thanks to the BIS UltraProtect® 1000 coating. Ideal for indoor and outdoor applications, with temperature resistance from -30 °C to +120 °C.

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® G2 Clamp BUP EPDM M8 40–45mm is a robust, two-screw pipe clamp designed for secure fastening of steel, copper, cast iron, and multilayer pipes in the Ø 40–45 mm range. It features a quick-closing mechanism for easy one-handed installation and a dual-component EPDM rubber lining that supports precise pipe positioning while reducing noise in accordance with DIN 4109. Engineered for long-term performance, it is protected with the BIS UltraProtect® 1000 coating, making it ideal for both indoor and outdoor applications. It offers excellent resistance to corrosion (tested for 1,000 hours salt spray per ISO 9227) and withstands temperatures from -30 °C to +120 °C.

Manufacturing Origin:
Manufactured in the Mijdrecht, Netherlands through a precision-controlled, environmentally responsible process.

Manufacturing Process Overview:
Steel Coil Processing: High-quality steel is uncoiled, flattened, and cut to ensure consistent strength and structural performance.
Stamping & Bending: Clamp halves are formed with precision tooling to meet exact dimensional tolerances and reduce waste.
Threading & Welding: A connecting nut is attached using energy-efficient resistance welding for secure mechanical fastening.
Surface Coating: Coated with BIS UltraProtect® 1000 (BUP 1000), the clamp provides up to 1000 hours of corrosion resistance per ISO 9227:2012, extending the lifespan and eliminating the need for post-installation treatments.
Final Assembly: Includes pre-installed locking screws, captive nut holder (PP), and anti-loss washer (POM), streamlining installation and reducing on-site preparation.

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 Performance:
Corrosion Resistance: BUP 1000 coating ensures long-term protection with no additional chemical treatments, reducing environmental exposure.
Low Material Impact: All major components (steel body, EPDM lining, PP and POM inserts) are recyclable. No halogens or PVC present.
Sustainable Lifecycle: Designed for durability and long service life, minimizing the need for replacement and associated environmental costs.

Installation and Use Phase:
VOC-Free: No Volatile Organic Compound (VOC) emissions during installation or use, supporting healthy indoor environments.
Minimal Maintenance: High durability reduces maintenance requirements over time.

End-of-Life Considerations:
Recyclability: Components can be disassembled and recycled using standard industrial processes.
Material Recovery: Steel, EPDM, PP, and POM components are marked for clear separation and processing.
Eco-Design: Clamp construction supports circular economy practices through durability, disassembly, and material reusability.

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

Total Weight	86 g

Component (> 1%)	(%)
Steel (combined)	88,65%
Rubber - EPDM	9,04%

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.

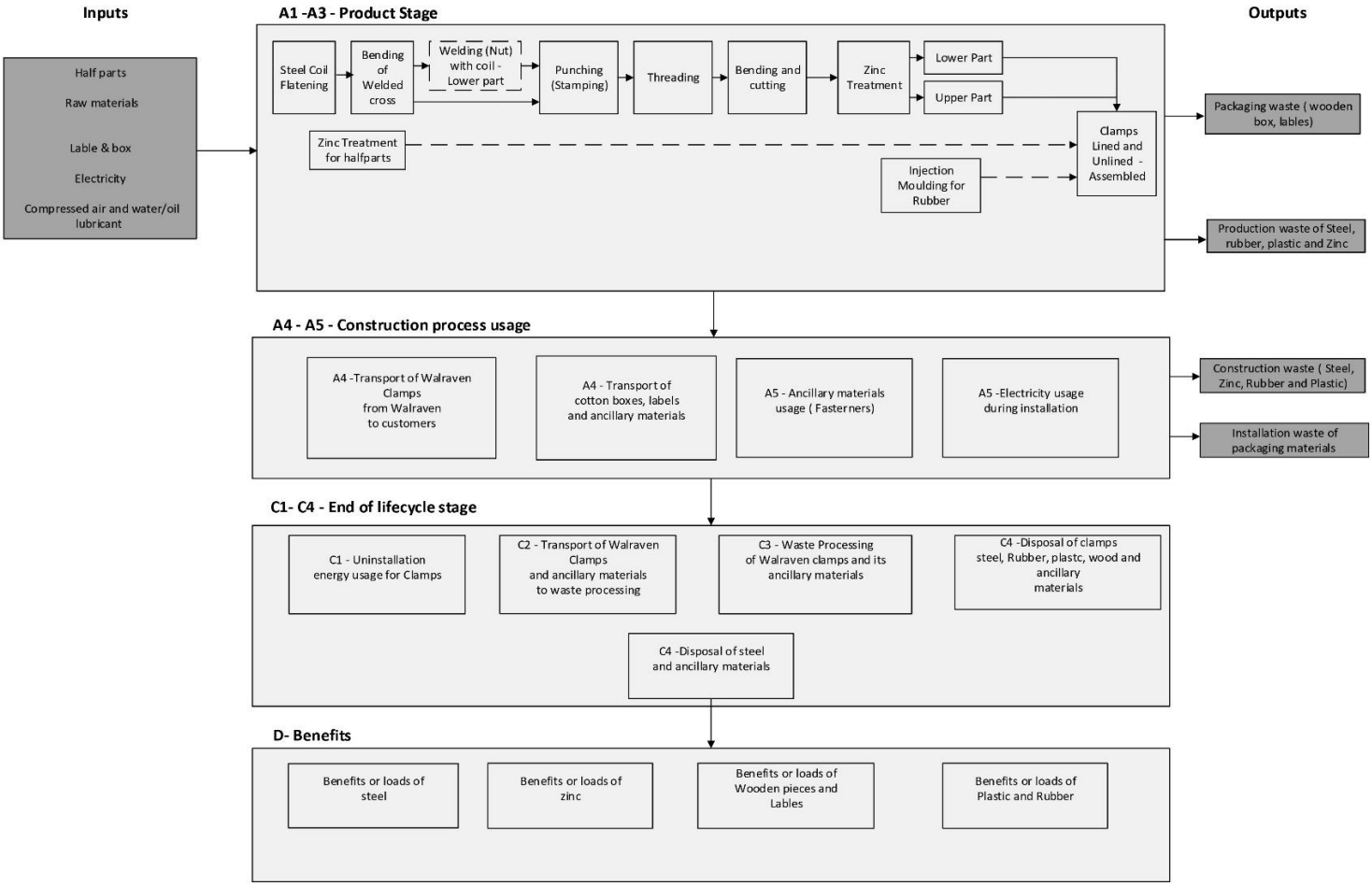
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental 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 the Walraven Bifix® G2 Clamp BUP EPDM M8 40-45mm. 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 Bifix® G2 Clamp BUP EPDM M8/10 10-14mm
Walraven Bifix® G2 Clamp BUP EPDM M8 10-14mm
Walraven Bifix® G2 Clamp BUP EPDM M10 10-14mm
Walraven Bifix® G2 Clamp BUP EPDM M8/10 15-19mm
Walraven Bifix® G2 Clamp BUP EPDM M8 15-19mm
Walraven Bifix® G2 Clamp BUP EPDM M10 15-19mm
Walraven Bifix® G2 Clamp BUP EPDM M8/10 20-23mm
Walraven Bifix® G2 Clamp BUP EPDM M8 20-23mm
Walraven Bifix® G2 Clamp BUP EPDM M10 20-23mm
Walraven Bifix® G2 Clamp BUP EPDM M8/10 25-28mm
Walraven Bifix® G2 Clamp BUP EPDM M8 25-28mm
Walraven Bifix® G2 Clamp BUP EPDM M10 25-28mm
Walraven Bifix® G2 Clamp BUP EPDM M8/10 31-35mm
Walraven Bifix® G2 Clamp BUP EPDM M8 31-35mm
Walraven Bifix® G2 Clamp BUP EPDM M10 31-35mm
Walraven Bifix® G2 Clamp BUP EPDM M8/10 36-39mm
Walraven Bifix® G2 Clamp BUP EPDM M8 36-39mm
Walraven Bifix® G2 Clamp BUP EPDM M10 36-39mm
Walraven Bifix® G2 Clamp BUP EPDM M8/10 40-45mm
Walraven Bifix® G2 Clamp BUP EPDM M8 40-45mm
Walraven Bifix® G2 Clamp BUP EPDM M10 40-45mm
Walraven Bifix® G2 Clamp BUP EPDM M8/10 48-52mm
Walraven Bifix® G2 Clamp BUP EPDM M8 48-52mm
Walraven Bifix® G2 Clamp BUP EPDM M10 48-52mm
Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 16mm
Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 20mm
Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 25mm
Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 32mm
Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 40mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 20-23mm
Walraven KSB2 Clamp zinc plated EPDM M8/10/1/2" 20-23mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 25-28mm
Walraven KSB2 Clamp zinc plated EPDM M8/10/1/2" 25-28mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 31-35mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 10-14mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 15-19mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 36-39mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 40-45mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 48-52mm

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.	1,32E-03	1,21E-06	4,28E-07	1,33E-03	4,41E-08	6,20E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,03E-07	8,65E-08	1,49E-10	-8,51E-05
ADPF	MJ	3,30E+00	7,24E-01	4,29E-01	5,99E+03	2,64E-02	1,83E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,16E-02	2,39E-02	4,51E-04	-9,05E-01
GWP	kg CO2 eq.	2,07E-01	4,75E-02	2,34E-02	2,78E-01	1,73E-03	1,25E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,03E-03	2,20E-02	1,60E-05	-5,49E-02
ODP	kg CFC11 eq.	1,68E-08	8,41E-09	2,27E-09	2,75E-08	3,06E-10	1,24E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,15E-10	2,60E-10	5,30E-12	-3,95E-09
POCP	kg ethene eq.	2,08E-04	2,89E-05	2,07E-07	2,37E-04	1,04E-06	6,88E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,43E-06	1,42E-06	1,70E-08	-1,05E-04
AP	kg SO2 eq.	1,08E-03	2,17E-04	3,97E-05	1,34E-03	7,59E-06	5,83E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,77E-05	1,69E-05	1,16E-07	-2,15E-04
EP	kg (PO4) 3 eq.	1,54E-04	4,18E-05	7,09E-06	2,03E-04	1,49E-06	9,20E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,48E-06	2,56E-06	2,25E-08	-2,62E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	4,11E-01	2,00E-02	2,16E-03	4,33E-01	7,27E-04	2,02E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,70E-03	1,93E-03	7,42E-06	-3,30E-02
FAETP	kg DCB eq.	5,42E-03	5,82E-04	8,59E-05	6,09E-03	2,12E-05	3,11E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,95E-05	4,15E-05	3,01E-07	3,06E-05
MAETP	kg DCB eq.	1,06E+01	2,10E+00	3,41E-01	1,31E+01	7,63E-02	6,54E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,78E-01	1,66E-01	6,30E-04	-4,02E-01
TETP	kg DCB eq.	2,54E-03	7,07E-05	1,82E-04	2,79E-03	2,57E-06	2,47E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,99E-06	6,87E-06	1,86E-08	2,13E-03
ECI	euro	5,53E-02	5,77E-03	1,67E-03	6,27E-02	2,08E-04	2,89E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,85E-04	1,39E-03	2,28E-06	-7,01E-03
ADPF	kg Sb eq.	1,59E-03	3,48E-04	2,06E-04	2,88E+00	1,27E-05	8,80E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,96E-05	1,15E-05	2,17E-07	-4,35E-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.	2,13E-01	4,79E-02	2,34E-02	2,85E-01	1,74E-03	1,27E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,07E-03	2,13E-02	1,63E-05	-5,81E-02
GWP-fossil	kg CO2 eq.	2,12E-01	4,79E-02	2,34E-02	2,84E-01	1,74E-03	1,27E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,06E-03	2,20E-02	1,63E-05	-5,82E-02
GWP-biogenic	kg CO2 eq.	7,43E-04	1,78E-05	-5,00E-07	7,60E-04	6,49E-07	3,85E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,52E-06	-8,00E-04	9,86E-09	0,00E+00
GWP-luluc	kg CO2 eq.	3,79E-04	1,77E-05	-5,55E-07	3,96E-04	6,38E-07	2,07E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,49E-06	1,84E-06	4,54E-09	1,43E-05
ODP	kg CFC11 eq.	1,77E-08	1,06E-08	2,47E-09	3,07E-08	3,84E-10	1,41E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,97E-10	2,92E-10	6,67E-12	-4,03E-09
AP	mol H+ eq.	1,33E-03	2,88E-04	5,35E-05	1,67E-03	1,01E-05	7,32E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,36E-05	2,13E-05	1,54E-07	-2,62E-04
EP-fresh water	kg PO4 eq.	1,50E-05	4,80E-07	4,55E-07	1,59E-05	1,76E-08	6,89E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,10E-08	1,09E-07	1,83E-10	-2,33E-06
EP-marine	kg N eq.	2,72E-04	1,00E-04	1,09E-05	3,83E-04	3,56E-06	1,77E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,30E-06	5,17E-06	5,31E-08	-4,71E-05
EP-terrestrial	mol N eq.	3,00E-03	1,10E-03	1,65E-04	4,27E-03	3,92E-05	1,96E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,15E-05	5,93E-05	5,86E-07	-5,46E-04
POCP	kg NMVOC eq.	1,04E-03	3,14E-04	2,68E-05	1,38E-03	1,12E-05	5,59E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,61E-05	1,59E-05	1,70E-07	-3,20E-04
ADP-minerals & metals	kg Sb eq.	1,32E-03	1,21E-06	4,28E-07	1,33E-03	4,41E-08	6,20E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,03E-07	8,65E-08	1,49E-10	-8,51E-05
ADP-fossil	MJ, net calorific value	2,98E+00	7,21E-01	3,98E-01	4,10E+00	2,63E-02	1,76E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,13E-02	2,41E-02	4,54E-04	-6,95E-01
WDP	m3 world eq. Deprived	1,21E-01	2,57E-03	5,38E-03	1,29E-01	9,39E-05	5,51E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,19E-04	4,96E-04	1,98E-05	-1,93E-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	1,49E-08	4,27E-09	8,22E-11	1,92E-08	1,56E-10	8,31E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,65E-10	2,43E-10	2,99E-12	-3,38E-09
IRP	kBq U235 eq.	1,22E-02	3,02E-03	6,61E-04	1,59E-02	1,10E-04	7,82E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,57E-04	1,13E-04	1,88E-06	-7,06E-04
ETP-fw	CTUe	1,75E+01	6,42E-01	2,13E-01	1,84E+01	2,34E-02	8,09E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,46E-02	1,36E-01	3,50E-04	-2,43E+00
HTP-c	CTUh	1,33E-09	2,09E-11	-1,12E-11	1,34E-09	7,60E-13	6,58E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,77E-12	2,58E-12	7,23E-15	-2,93E-11
HTP-nc	CTUh	2,06E-08	7,01E-10	1,58E-10	2,14E-08	2,56E-11	1,48E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,97E-11	1,20E-10	2,53E-13	7,94E-09
SQP	-	1,01E+00	6,21E-01	5,03E-01	2,14E+00	2,28E-02	1,05E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,31E-02	4,26E-02	9,57E-04	-1,57E-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	1,75E-04	1,82E-06	1,56E-06	1,78E-04	6,65E-08	8,13E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,55E-07	7,95E-08	6,75E-10	-1,59E-05
NHWD	kg	6,00E-02	4,54E-02	7,55E-04	1,06E-01	1,67E-03	5,51E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,89E-03	1,07E-03	3,05E-03	-5,60E-03
RWD	kg	1,08E-05	4,74E-06	6,30E-07	1,61E-05	1,72E-07	7,71E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,02E-07	1,33E-07	2,98E-09	-1,42E-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	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	5,64E-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	8,20E-03	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	5,51E-02
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	3,20E-02

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	2,80E-01	9,00E-03	1,58E-01	4,48E-01	3,29E-04	2,20E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,67E-04	3,44E-03	4,31E-06	-1,20E-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	2,80E-01	9,00E-03	1,58E-01	4,48E-01	3,29E-04	2,20E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,67E-04	3,44E-03	4,31E-06	-1,20E-02
PENRE	MJ	3,17E+00	7,65E-01	4,35E-01	4,37E+00	2,79E-02	1,88E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,50E-02	2,56E-02	4,83E-04	-7,32E-01
PENRM	MJ	1,78E-01	0,00E+00	0,00E+00	1,78E-01	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	3,35E+00	7,65E-01	4,35E-01	4,55E+00	2,79E-02	1,88E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,50E-02	2,56E-02	4,83E-04	-7,32E-01
SM	kg	2,58E-02	0,00E+00	4,58E-05	2,58E-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	3,61E-03	8,74E-05	1,77E-04	3,88E-03	3,20E-06	1,73E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,46E-06	3,64E-05	4,88E-07	-4,61E-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® G2 Clamps Lined - 40-45 mm 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® G2 Clamp BUP EPDM M8 40-45mm 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 cover the upstream life cycle stages, beginning with Module A1, which focuses on the extraction and production of raw materials and upstream processes such as packaging, water, lubricants, and material inputs. In this section, all relevant raw materials and auxiliary substances used in the manufacturing of the Walraven Bifix® G2 Clamp BUP EPDM M8 40-45mm are modeled based on the 2023–2024 bill of materials. The primary components include steel (various grades), plastics (POM and PP), EPDM rubber, and zinc coatings. All materials are modeled using the National Milieudatabase (NMD) v3.8 and Ecoinvent v3.6, applying generic references where primary data was unavailable. Steel is modeled using a composition of 57% primary and 43% secondary content, reflecting average market data per NMD guidelines.

Module A2 addresses the transportation of materials from suppliers to the Walraven production site in Mijdrecht, Netherlands. All transport distances were included and modeled in accordance with EN 15804:2012+A2:2019/AC:2021, using datasets from Ecoinvent 3.6 and NMD 3.8. A default average load factor of 50% was applied, representing a full truckload to the site and an empty return. Road transport emissions were modeled using the reference 0001-tra&Transport, vrachtwagen (freight, lorry, unspecified {GLO}).

Module A3 models the environmental impacts associated with production at the Walraven Mijdrecht facility. The analysis includes electricity and fuel consumption, packaging materials, and production waste, all based on primary data for the 2023–2024 operational year. Electricity was drawn from both the Dutch national grid and rooftop photovoltaic systems, resulting in a mixed-energy profile. Additional electricity was consumed for zinc treatment operations.

Production waste included steel scrap, of which a substantial proportion was recycled within the clamp production system. Waste and recycling volumes were allocated based on Mijdrecht's site-specific production share relative to Walraven's total annual output. Transport of waste materials to external recycling or disposal facilities was included in the modeling. Additionally, lubricating oil was consumed as an auxiliary input during manufacturing.

This module excludes capital goods, in line with the cutoff rule in EN 15804+A2, as their contribution was confirmed to be below the 5% threshold of the total environmental impact.

Module A4 covers the transportation of the finished Walraven Bifix® Clamp from the Mijdrecht production site to installation locations. The transport distance was standardized to 150 km, following reference values from the Bepalingsmethode v1.2 (2025). A load factor of 50% was applied, with emissions modeled using 0001-tra&Transport, vrachtwagen, consistent with NMD v3.8 and Ecoinvent v3.6 methodologies.

Module A5 includes all activities during installation, specifically addressing material losses and the management of resulting waste. A standard 5% loss was assumed due to typical handling inefficiencies during manual installation. No energy use was assigned to installation as it is carried out manually. Waste from installation was transported to processing facilities, with plastics and rubber transported 100 km to AVI (incineration) plants, and steel transported 100 km to landfill. Transport emissions were calculated in ton-kilometers (tkm).

Waste processing and disposal follow fixed end-of-life scenario values from the Bepalingsmethode v1.2 (2025):

End-of-Life Scenario Fixed Values:

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

Module C1 addresses the manual deconstruction or uninstallation 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 rubber and plastic are transported 100 km to AVI incineration plants, following assumptions from Bepalingsmethode v1.2. Transport emissions are calculated using the dataset 0001-tra&Transport, vrachtwagen from NMD v3.8 and Ecoinvent 3.6.

Module C3 models waste treatment operations. Steel and zinc are assumed to be fully sorted and recycled, while plastics and rubber are fully incinerated with energy recovery at AVI facilities. Emissions are modeled using the following references: 0264-avC&Verbranden kunststoffen (28.67 MJ/kg) for plastics, 0315-reC&Sorteren en persen oud ijzer for steel, and 0260-avC&Verbranden rubber/EPDM (27.2 MJ/kg) for rubber. All datasets are sourced from NMD v3.8 and Ecoinvent 3.6.

Module C4 addresses 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 benefits beyond the system boundary. Steel recycling is credited with a 52% substitution benefit, reflecting a 95% recycling rate offset by 43% primary content. Zinc is modeled with a 95% recycling benefit. Plastics and rubber incinerated at AVI plants are credited with 100% energy substitution, displacing fossil-based electricity.

This life cycle assessment is fully consistent with EN 15804:2012+A2:2019/AC:2021 and follows the modular methodology of Bepalingsmethode v1.2 (2025). All material flows, waste processing, recycling, and energy recovery are modeled using NMD v3.8 and Ecoinvent 3.6, reflecting 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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