

Environmental Product Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:
Walraven Bifix® G2 Clamp BUP M8/10 176-180mm

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



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MRPI® REGISTRATION

1.1.00953.2025

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 M8/10 176-180mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

DESCRIPTION OF PRODUCT

Robust steel two-screw hinged clamp with a quick locking system, ideal for square pipe supports. Part of the BIS UltraProtect® 1000 system, offering high corrosion resistance with a minimum of 1,000 hours salt spray protection (ISO 9227). Suitable for both indoor and outdoor installations.

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 an 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 M8/10 (176–180 mm) is a high-quality two-screw pipe clamp featuring a quick locking system, engineered for use with insulated, steel, and cast iron pipes. It is manufactured from steel and finished with the Walraven BIS UltraProtect® 1000 (BUP) coating, offering excellent corrosion resistance validated to $\geq 1,000$ hours in salt spray testing according to ISO 9227. The clamp is supplied fully pre-assembled, ready for immediate installation.

Manufacturing Location

This product is manufactured at Walraven's certified facility in the Czech Republic under established environmental management systems.

Manufacturing Process Overview

The clamp consists of a steel, paired with stainless steel combi slot screws. The BUP surface system provides long-term protection without the need for additional coatings. All components are assembled at the facility to ensure ease of installation and consistent quality.

Environmental Performance

The clamp incorporates approximately 50.2% recycled steel content. It is free from volatile organic compounds (VOC-free) and Substances of Very High Concern (SVHC-free). The product's environmental performance has been modelled according to EN 15804 + A2 standards using Ecochain Helix v4.3.1 and Ecoinvent 3.6 data. Its Reference Service Life (RSL) is estimated at 50 years under typical use conditions.

Installation and Use Phase

The hinged design with an integrated quick locking mechanism reduces installation time. The clamp is suitable for various pipe types, including HVAC, plumbing, and infrastructure applications. Its unlined design is appropriate for installations where acoustic dampening is not required, and it can be used in both indoor and sheltered outdoor environments.

End-of-Life Considerations

The clamp is designed for easy manual disassembly, allowing steel and stainless steel components to be fully recycled. Waste treatment and recovery are included in Modules C1–C4 and Module D, with transport distances modeled at 50–100 km and recycling credits applied to steel components.

Packaging and Transport

The product is supplied in recyclable cardboard packaging. Transport assumptions follow typical EURO 5 truck conditions at 50% load efficiency.

The product's corrosion resistance is tested per ISO 9227. The Life Cycle Assessment (LCA) is conducted in compliance with EN 15804 + A2, ISO 14040, ISO 14044, and ISO 14025 standards, using Ecochain Helix v4.3.1 for environmental modelling.

Name - Half parts	
Steel - Lower part	
Steel - Upper part	
Steel - Hollow pan head screw	
Steel - Nut	
Plastic - POM (PolyOxyMethylene) - Anti loss washer	
Plastic - PA (PolyAmide) - Nut holder	

Total Weight	351 g
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Component (> 1%)	(%)
Steel (combined)	96,20%



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.

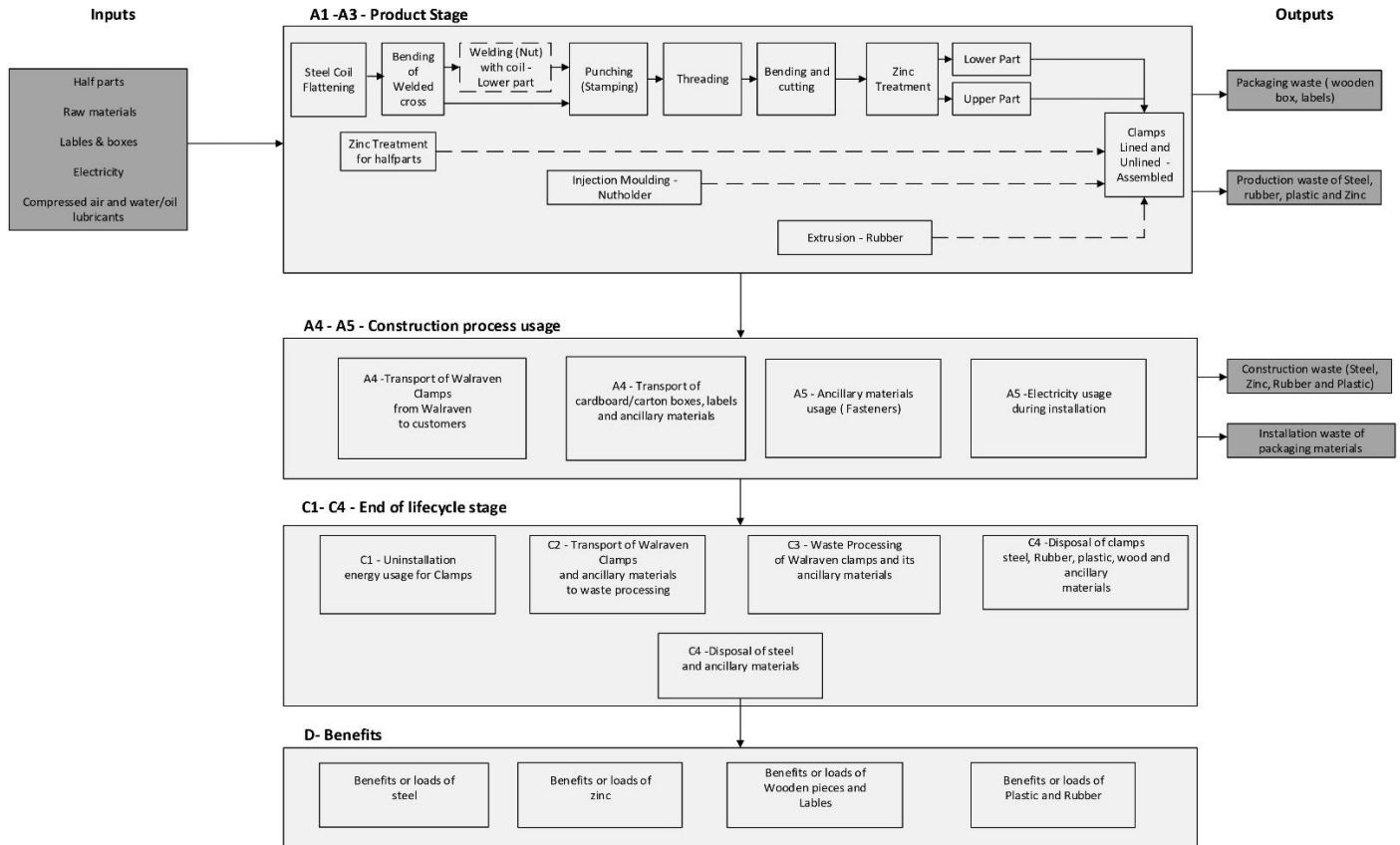
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental 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



REPRESENTATIVENESS

The aggregation was done by choosing the reference product as Walraven Bifix® G2 Clamp BUP M8/10 176-180mm. 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 2S Clamp zinc plated M8/10 217-225mm
Walraven Heavy Duty Clamp epoxy coated 3/8" 1/2" 110mm
Walraven Bifix® 412 Clamp pre-galvanized M8 400mm
Walraven Split Band Clip DIN 3567 (hdg) Type A 49 (47
Walraven Bifix® G2 Clamp BUP M8/10 176-180mm
Walraven Bifix® 300 Clamp Stainless M10 193-200mm
Walraven Split Band Clip DIN 3567 (untreated) Type A 49 (47 - 49 mm)
Walraven HD500 Clamp black M8/10 37-42mm
Walraven Industrial Saddle hot dip galvanized 125mm
Walraven HD500 Clamp BUP 1/2" 108-116mm
Walraven Split Band Clip DIN 3567 (hdg) Type A 43 (40
Walraven Industrial Saddle hot dip galvanized 114.3mm 4"
Walraven Bifix® G2 Clamp BUP M8/10 165-169mm
Walraven Bifix® 412 Clamp pre-galvanized M8 355mm
Walraven Split Band Clip DIN 3567 (untreated) Type A 43 (40 - 43 mm)
Walraven HD500 Clamp BUP M10/12 108-116mm
Walraven 434 Clamp stainless steel M10 PE-pipe 125mm
Walraven 3000 Clamp zinc plated M8 200mm
Walraven Split Band Clip DIN 3567 (hdg) Type A 34 (32
Walraven Bifix® 412 Clamp pre-galvanized M8 315mm
Walraven Split Band Clip DIN 3567 (untreated) Type A 34 (32 - 34 mm)
Walraven 434 Clamp stainless steel M10 PE-pipe 110mm
Walraven Bifix® 412 Clamp pre-galvanized M8 300mm
Walraven HD500 Clamp BUP M10 47-52mm

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.	1,46E-02	1,18E-06	4,33E-06	1,46E-02	1,80E-07	7,30E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,00E-07	9,00E-07	8,10E-10	-1,69E-07
ADPF	MJ	1,94E+01	7,19E-01	5,67E+00	2,58E+01	1,08E-01	1,17E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,80E-01	2,21E-01	2,46E-03	-2,98E+00
GWP	kg CO2 eq.	1,32E+00	4,73E-02	4,21E-01	1,79E+00	7,05E-03	7,98E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,17E-02	1,88E-02	8,68E-05	-2,32E-01
ODP	kg CFC11 eq.	9,42E-08	8,36E-09	2,37E-08	1,26E-07	1,25E-09	6,18E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,08E-09	2,08E-09	2,89E-11	-8,09E-09
POCP	kg ethene eq.	1,17E-03	2,95E-05	-1,21E-04	1,08E-03	4,25E-06	2,99E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,09E-06	1,42E-05	9,25E-08	-5,05E-04
AP	kg SO2 eq.	7,80E-03	2,37E-04	1,42E-03	9,46E-03	3,10E-05	4,46E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,16E-05	1,58E-04	6,35E-07	-7,85E-04
EP	kg (PO4) 3 eq.	1,12E-03	4,36E-05	3,03E-04	1,47E-03	6,09E-06	7,06E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,01E-05	2,02E-05	1,22E-07	-9,33E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	2,48E+00	2,01E-02	-1,65E-02	2,49E+00	2,97E-03	1,18E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,94E-03	1,96E-02	3,92E-05	-1,45E-01
FAETP	kg DCB eq.	4,53E-02	5,77E-04	2,02E-03	4,79E-02	8,66E-05	2,52E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,44E-04	3,71E-04	9,31E-07	1,80E-03
MAETP	kg DCB eq.	8,47E+01	2,09E+00	1,03E+01	9,71E+01	3,12E-01	5,05E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,19E-01	1,60E+00	3,33E-03	1,50E+00
TETP	kg DCB eq.	1,49E-02	7,06E-05	2,03E-03	1,70E-02	1,05E-05	1,46E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,75E-05	6,08E-05	9,86E-08	1,21E-02
ECI	euro	3,48E-01	5,86E-03	2,94E-02	3,83E-01	8,49E-04	1,80E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,42E-03	3,73E-03	1,23E-05	-2,90E-02
ADPF	kg Sb eq.	9,35E-03	3,46E-04	2,73E-03	1,24E-02	5,18E-05	5,62E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,64E-05	1,06E-04	1,18E-06	-1,43E-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.	1,36E+00	4,77E-02	4,18E-01	1,83E+00	7,11E-03	8,08E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,19E-02	1,16E-02	8,85E-05	-2,49E-01
GWP-fossil	kg CO2 eq.	1,35E+00	4,77E-02	4,17E-01	1,82E+00	7,11E-03	8,02E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,18E-02	1,90E-02	8,85E-05	-2,49E-01
GWP-biogenic	kg CO2 eq.	6,28E-03	1,76E-05	6,73E-04	6,97E-03	2,65E-06	3,69E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,42E-06	-7,35E-03	5,17E-08	0,00E+00
GWP-luluc	kg CO2 eq.	2,77E-03	1,79E-05	4,35E-04	3,23E-03	2,60E-06	1,72E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,34E-06	1,83E-05	2,47E-08	1,84E-04
ODP	kg CFC11 eq.	9,57E-08	1,05E-08	1,85E-08	1,25E-07	1,57E-09	6,26E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,61E-09	2,41E-09	3,64E-11	-6,08E-09
AP	mol H+ eq.	9,63E-03	3,13E-04	1,70E-03	1,16E-02	4,12E-05	5,49E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,87E-05	1,97E-04	8,40E-07	-9,61E-04
EP-fresh water	kg PO4 eq.	1,10E-04	4,73E-07	7,01E-05	1,81E-04	7,17E-08	8,65E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,19E-07	1,11E-06	9,92E-10	-8,79E-06
EP-marine	kg N eq.	2,05E-03	1,06E-04	2,39E-04	2,39E-03	1,45E-05	1,15E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,42E-05	4,35E-05	2,89E-07	-1,78E-04
EP-terrestrial	mol N eq.	2,27E-02	1,16E-03	2,91E-03	2,68E-02	1,60E-04	1,28E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,67E-04	5,05E-04	3,18E-06	-2,08E-03
POCP	kg NMVOC eq.	7,15E-03	3,29E-04	3,78E-04	7,86E-03	4,57E-05	3,35E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,62E-05	1,38E-04	9,25E-07	-1,41E-03
ADP-minerals & metals	kg Sb eq.	1,46E-02	1,18E-06	4,33E-06	1,46E-02	1,80E-07	7,30E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,00E-07	9,00E-07	8,10E-10	-1,69E-07
ADP-fossil	MJ, net calorific value	1,77E+01	7,16E-01	6,13E+00	2,45E+01	1,07E-01	1,17E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,79E-01	2,26E-01	2,47E-03	-1,74E+00
WDP	m3 world eq. Deprived	9,00E-01	2,52E-03	9,11E-02	9,94E-01	3,83E-04	4,75E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,39E-04	2,40E-03	1,11E-04	-4,75E-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 incidence	8,83E-08	4,20E-09	-6,73E-09	8,58E-08	6,38E-10	3,78E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,06E-09	2,47E-09	1,63E-11	-1,44E-08
IRP	kBq U235 eq.	8,72E-02	3,00E-03	3,45E-02	1,25E-01	4,49E-04	6,57E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,48E-04	1,12E-03	1,01E-05	4,25E-03
ETP-fw	CTUe	1,61E+02	6,34E-01	3,17E-01	1,62E+02	9,56E-02	7,73E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,59E-01	9,99E-01	1,60E-03	-8,34E+00
HTP-c	CTUh	9,02E-09	2,10E-11	-5,83E-10	8,46E-09	3,10E-12	4,23E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,17E-12	2,40E-11	3,71E-14	-3,19E-11
HTP-nc	CTUh	1,61E-07	6,90E-10	1,62E-10	1,62E-07	1,05E-10	1,06E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,74E-10	1,13E-09	1,14E-12	4,82E-08
SQP	-	7,18E+00	6,08E-01	1,67E+00	9,45E+00	9,29E-02	4,89E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,55E-01	4,51E-01	5,19E-03	-3,84E-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	1,90E-03	1,79E-06	-7,74E-06	1,89E-03	2,72E-07	9,31E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,53E-07	6,80E-07	3,70E-09	-2,98E-05
NHWD	kg	3,71E-01	4,43E-02	3,37E-02	4,49E-01	6,80E-03	2,33E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,13E-02	6,59E-03	1,68E-02	-2,44E-02
RWD	kg	6,81E-05	4,71E-06	2,89E-05	1,02E-04	7,04E-07	5,32E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,17E-06	1,33E-06	1,62E-08	1,47E-06
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,19E-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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,06E-03	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	9,23E-04	9,23E-04	0,00E+00	4,61E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,95E-03
ETE	MJ	0,00E+00	0,00E+00	5,37E-04	5,37E-04	0,00E+00	2,68E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,62E-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	1,98E+00	8,86E-03	6,87E-01	2,67E+00	1,34E-03	1,38E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,24E-03	3,54E-02	2,00E-05	5,04E-02
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,98E+00	8,86E-03	6,87E-01	2,67E+00	1,34E-03	1,38E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,24E-03	3,54E-02	2,00E-05	5,04E-02
PENRE	MJ	1,88E+01	7,60E-01	6,61E+00	2,62E+01	1,14E-01	1,25E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,90E-01	2,40E-01	2,63E-03	-1,81E+00
PENRM	MJ	2,57E-02	0,00E+00	0,00E+00	2,57E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,88E+01	7,60E-01	6,61E+00	2,62E+01	1,14E-01	1,25E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,90E-01	2,40E-01	2,63E-03	-1,81E+00
SM	kg	1,44E-01	0,00E+00	7,72E-05	1,45E-01	0,00E+00	3,86E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	2,71E-02	8,60E-05	1,14E-02	3,86E-02	1,31E-05	1,89E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,18E-05	1,10E-04	2,64E-06	-9,01E-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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	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 for the Walraven Bifix® G2 Clamp BUP M8/10 176-180mm have been modelled to reflect actual conditions as closely as possible. Primary data from Walraven's Czech Republic production site was prioritized. Where supplier-specific data was unavailable or incomplete, representative background data from verified sources such as the Nationale Milieudatabase v3.8 and Ecoinvent 3.6 was used.

For Module A1, detailed product composition was obtained directly from Walraven's internal specifications. Module A2 incorporates the actual transport distances from material suppliers to the production site. Module A3 reflects measured data from 2023/2024 on energy consumption, waste generation, and material usage. Background data was selected for relevance and geographic proximity, ensuring compliance with EN15804+A2:2019 requirements.

Data Collection Period

The dataset represents production processes for the year 2023/2024.

Methodology and Reproducibility

The LCA was conducted in accordance with EN15804+A2:2019, ISO 14040, ISO 14044, ISO 14025, and the NMD Bepalingsmethode v1.2 (2025). Modelling and calculations were performed using Ecochain Helix version 4.3.1. The study covers the following life cycle stages: A1–A3 for raw material extraction, transport, and manufacturing; A4–A5 for transport to site and installation; C1–C4 for end-of-life treatment including deconstruction, transport, processing, and disposal; and D for reuse, recovery, and recycling potential.

Inventory and Allocation

All material and energy inputs, emissions, and outputs are included in line with the modular EN15804 structure. Mass-based allocation was applied to distribute shared site-level inputs, such as electricity and packaging, across products. No secondary materials were used in production. Cut-off criteria were respected, ensuring that excluded flows do not exceed 5% of mass or energy per module.

Data Sources

Primary data was collected from Walraven's Czech production facility, including product composition, energy use, transport distances, and waste treatment. Where supplier-specific data was missing, representative datasets from Ecoinvent 3.6 and Nationale Milieudatabase v3.8 were applied. Emissions, grid energy mix, and end-of-life scenarios were included using validated background data, with infrastructure and capital goods considered where relevant.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 1)

Modules A1 to A3 represent the upstream and core production processes. Module A1 includes the sourcing and preparation of raw materials such as various steel components, zinc coating, and small plastic parts (PA and POM). The steel parts (upper and lower clamp sections, screws, nuts) and zinc surface treatment are modeled using production data from 2023/2024 and are based on background data from NMD v3.8 and Ecoinvent v3.6. Steel inputs were modeled assuming 57% primary and 43% secondary content, in line with typical European supply chain mixes. Zinc inputs were modeled using updated galvanized coating references. Plastic components (nut holders and washers) were included in trace amounts.

Module A2 models the transport of raw materials to the Walraven Czech Republic facility. Transport data includes road freight (truck), and overseas shipment (ship) for selected materials like screws and nuts. All routes and distances are documented in the background LCA. A standard load efficiency of 50% is assumed (full inbound, empty return), per EN 15804+A2 and Bepalingsmethode v1.2 guidance.

Module A3 addresses the manufacturing processes at Walraven's Czech facility using 2023/2024 primary site data. The model includes electricity consumption (low-voltage Czech grid mix), fuels for zinc treatment, lubricating oil as an auxiliary input, and packaging materials. Production waste such as steel scrap is internally recycled, and emissions from manufacturing and welding are captured. Capital goods are excluded under the <5% cutoff rule in EN 15804+A2.

Module A4 models transport of the finished product to the construction site, assuming a 150 km distribution distance based on Bepalingsmethode v1.2 default values. A 50% load factor is used, and emissions are modeled using generic lorry data from Ecoinvent v3.6 / NMD v3.8.

Module A5 covers product installation. A 5% material loss is assumed due to manual handling. No energy is used during installation. The resulting waste (steel, zinc, plastic) is transported for treatment: steel and zinc to landfill (100 km), plastics to incineration (100 km). These assumptions align with the standardized Dutch end-of-life model.

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%

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION (PART 2)

Module C1 assumes that the Walraven Bifix® G2 Clamp BUP M8/10 176-180mm is manually deconstructed without the use of energy. Module C2 models the transportation of waste materials to processing sites, with steel and zinc transported 50 km for recycling or disposal, and plastic components transported 100 km to incineration facilities (AVI), using emission factors from NMD v3.8.

Module C3 addresses waste treatment, with steel and zinc fully recycled and plastic components entirely incinerated with energy recovery. Emission references for these processes include Plastics: 0264-avC&Verbranden kunststoffen and Steel: 0315-reC&Sorteren en persen oud ijzer. Module C4 accounts for final disposal, with 5% of steel and zinc sent to landfill, while plastic is fully incinerated, using disposal references Steel: 0253-sto&Stort staal and Zinc: 0248-sto&Stort koper, lood, verzinkt staal, zink.

Module D captures the environmental benefits beyond the system boundary. Recycled steel receives a credit of 52% (95% recycling efficiency minus 43% secondary content), zinc is credited at 95% recycling efficiency, and energy recovered from plastic incineration contributes 100% energy substitution. These credits reduce the net environmental impact of the product.

This end-of-life modeling is fully compliant with EN 15804+A2:2019 + AC:2021 and the Dutch Bepalingsmethode v1.2 (2025), following a modular LCA approach with consistent system boundaries and cutoff criteria.

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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