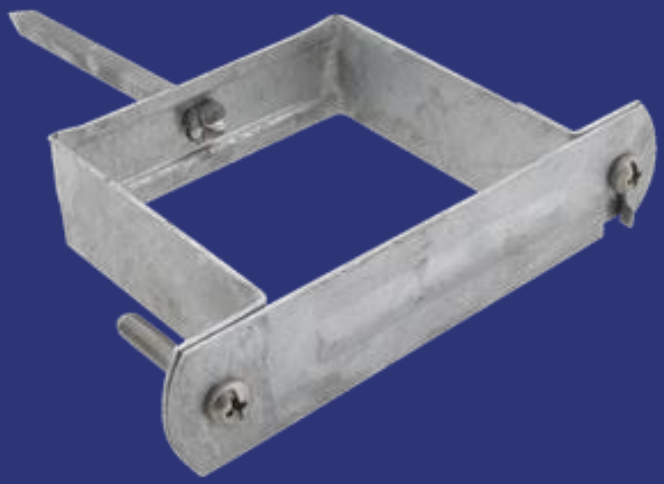
Environmental
Product
Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:
Walraven Hinged Pipe Clamp 400 square BUP 80mm

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



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MRPI® REGISTRATION

1.1.00958.2025

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 Hinged Pipe Clamp 400 square BUP 80mm

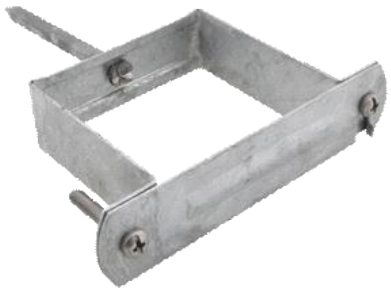
DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

DESCRIPTION OF PRODUCT

Steel hinged clamp with quick locking system, designed for securing square rainwater pipes. Equipped with stainless steel combi slot locking screws. Part of the BIS UltraProtect® 1000 system, ensuring indoor/outdoor suitability and high corrosion resistance (≥1,000 hours salt spray test, ISO 9227).

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 Hinged Pipe Clamp 400 Square BUP 80 mm is a durable, hinged steel clamp designed for securing square rainwater pipes. It features a quick locking system for rapid installation and forms part of the BIS UltraProtect® 1000 system, providing high corrosion resistance for both indoor and outdoor environments. The product has been verified to withstand over 1,000 hours in salt spray testing in accordance with ISO 9227.

Manufacturing Location
The clamp is produced at Walraven's certified facility in the Horka, Czech Republic, ensuring consistent quality and adherence to environmental management standards.

Manufacturing Process Overview
The clamp body is made from steel, while the locking screws are stainless steel with a combi slot. The surface is treated with the BUP finish as part of the UltraProtect® 1000 system. The clamp is fully pre-assembled at the factory, ready for immediate installation without the need for additional tools.

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 BUP surface treatment ensures long-term corrosion resistance and structural durability for indoor and outdoor applications. The steel used contains approximately 50.2% recycled content. The product is free from Substances of Very High Concern (SVHC) and does not emit volatile organic compounds (VOC) during production or use. The lifecycle of the product has been assessed in accordance with EN 15804 + A2, ISO 14025, and ISO 14040/44. Environmental performance data is modeled using Ecochain Helix v4.3.1 with background data from Ecoinvent v3.6 and Nationale Milieudatabase v3.8.

Installation and Use Phase
The hinged design and integrated quick locking system simplify installation and reduce labor time. The clamp is suitable for securing square rainwater pipes in utility, drainage, and façade applications, providing long-term durability and resistance to harsh environmental conditions. The necessary internal transport of Czech Republic to Netherlands has been accounted in the production process of A1-A3.

End-of-Life Considerations
The clamp is manually separable, facilitating material recovery. Over 95% of the components are recyclable. Module D benefits from steel and zinc recovery, and waste processing modeling assumes transport distances of 50–100 km to recycling or disposal facilities.

Packaging and Transport
The product is supplied in recyclable cardboard packaging. Transport is modeled using a 16–32 ton EURO 5/6 truck at 50% load capacity, in accordance with EN 15804 standards.

Compliance and Certifications
The clamp meets ISO 9227 corrosion resistance requirements and has been assessed under EN 15804 + A2, ISO 14025, and ISO 14040/44. Data modeling was performed using Ecochain Helix v4.3.1 with validated secondary data sources.

Reference Service Life
The product is designed for a reference service life of up to 50 years under standard operating conditions.

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

Total Weight	186 g

Component (> 1%)	(%)
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.

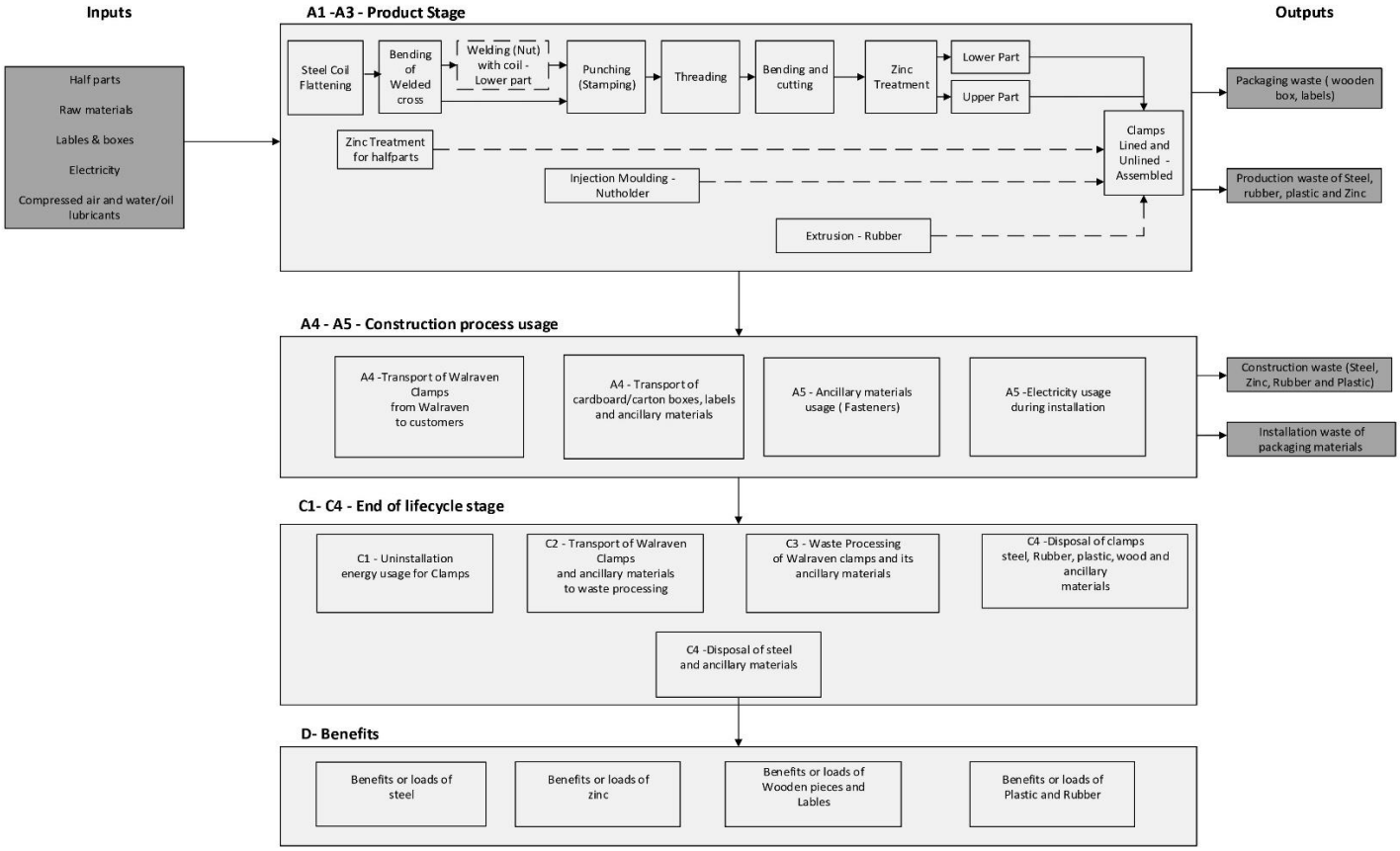
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental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



REPRESENTATIVENESS

The aggregation was done by choosing the reference product as Walraven Hinged Pipe Clamp 400 square BUP 80mm. 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 110mm
Walraven 434 Clamp stainless steel M10 PE-pipe 32mm
Walraven 434 Clamp zinc plated M10 PE-pipe 56mm
Walraven Bifix® 415 Clamp Stainless M8 160mm
Walraven Hinged Pipe Clamp 400 square BUP 80mm
Walraven 434 Clamp zinc plated G1/2" PE-Pipe 50mm
Walraven Industrial Saddle hot dip galvanized 88.9mm 3"
Walraven Two-Screw Clamp Stainless M8/10 114-119mm
Walraven HD500 Clamp BUP M8/10 31-36mm
Walraven Bifix® 412 Clamp pre-galvanized M8 125mm
Walraven HD500 Clamp BUP M10 59-65mm
Walraven Two-Screw Clamp Stainless M8/10 106-112mm
Walraven Bifix® 300 Clamp Stainless M10 100-105mm
Walraven Industrial Saddle hot dip galvanized 76.1mm 2 1/2"

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.	6,06E-03	5,44E-07	4,33E-06	6,06E-03	9,54E-08	3,03E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,59E-07	4,52E-07	4,07E-10	-8,46E-08
ADPF	MJ	8,99E+00	3,25E-01	5,67E+00	1,50E+01	5,71E-02	6,88E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,51E-02	1,10E-01	1,24E-03	-1,50E+00
GWP	kg CO2 eq.	6,12E-01	2,13E-02	4,21E-01	1,05E+00	3,73E-03	4,78E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,22E-03	8,05E-03	4,37E-05	-1,17E-01
ODP	kg CFC11 eq.	4,32E-08	3,78E-09	2,37E-08	7,08E-08	6,62E-10	3,47E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,10E-09	1,01E-09	1,45E-11	-4,07E-09
POCP	kg ethene eq.	5,65E-04	1,28E-05	-1,21E-04	4,57E-04	2,25E-06	1,08E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,75E-06	7,10E-06	4,65E-08	-2,54E-04
AP	kg SO2 eq.	3,51E-03	9,36E-05	1,42E-03	5,02E-03	1,64E-05	2,38E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,74E-05	7,91E-05	3,19E-07	-3,95E-04
EP	kg (PO4) 3 eq.	5,04E-04	1,84E-05	3,03E-04	8,26E-04	3,23E-06	3,99E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,38E-06	1,01E-05	6,16E-08	-4,69E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	1,21E+00	8,96E-03	-1,65E-02	1,20E+00	1,57E-03	5,71E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,62E-03	9,76E-03	1,97E-05	-7,30E-02
FAETP	kg DCB eq.	1,98E-02	2,62E-04	2,02E-03	2,20E-02	4,59E-05	1,16E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,65E-05	1,82E-04	4,68E-07	9,05E-04
MAETP	kg DCB eq.	3,74E+01	9,41E-01	1,03E+01	4,86E+01	1,65E-01	2,53E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,75E-01	7,90E-01	1,67E-03	7,56E-01
TETP	kg DCB eq.	7,25E-03	3,17E-05	2,03E-03	9,31E-03	5,56E-06	7,73E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,26E-06	3,04E-05	4,96E-08	6,10E-03
ECI	euro	1,65E-01	2,57E-03	2,94E-02	1,97E-01	4,50E-04	9,29E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,50E-04	1,80E-03	6,17E-06	-1,46E-02
ADPF	kg Sb eq.	4,33E-03	1,57E-04	2,73E-03	7,21E-03	2,75E-05	3,31E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,58E-05	5,29E-05	5,95E-07	-7,21E-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.	6,30E-01	2,15E-02	4,18E-01	1,07E+00	3,77E-03	4,82E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,28E-03	4,57E-03	4,45E-05	-1,25E-01
GWP-fossil	kg CO2 eq.	6,27E-01	2,15E-02	4,17E-01	1,06E+00	3,77E-03	4,79E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,28E-03	8,14E-03	4,45E-05	-1,25E-01
GWP-biogenic	kg CO2 eq.	2,71E-03	8,01E-06	6,73E-04	3,39E-03	1,40E-06	1,80E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,34E-06	-3,58E-03	2,60E-08	0,00E+00
GWP-luluc	kg CO2 eq.	1,21E-03	7,87E-06	4,35E-04	1,65E-03	1,38E-06	8,78E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,30E-06	9,12E-06	1,24E-08	9,24E-05
ODP	kg CFC11 eq.	4,39E-08	4,74E-09	1,85E-08	6,72E-08	8,31E-10	3,38E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,39E-09	1,17E-09	1,83E-11	-3,06E-09
AP	mol H+ eq.	4,33E-03	1,25E-04	1,70E-03	6,15E-03	2,18E-05	2,91E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,64E-05	9,87E-05	4,22E-07	-4,83E-04
EP-fresh water	kg PO4 eq.	4,95E-05	2,17E-07	7,01E-05	1,20E-04	3,80E-08	5,80E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,33E-08	5,55E-07	4,99E-10	-4,42E-06
EP-marine	kg N eq.	9,18E-04	4,39E-05	2,39E-04	1,20E-03	7,69E-06	5,77E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,28E-05	2,18E-05	1,45E-07	-8,96E-05
EP-terrestrial	mol N eq.	1,02E-02	4,84E-04	2,91E-03	1,35E-02	8,48E-05	6,49E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,41E-04	2,53E-04	1,60E-06	-1,05E-03
POCP	kg NMVOC eq.	3,28E-03	1,38E-04	3,78E-04	3,79E-03	2,42E-05	1,61E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,04E-05	6,90E-05	4,65E-07	-7,11E-04
ADP-minerals & metals	kg Sb eq.	6,06E-03	5,44E-07	4,33E-06	6,06E-03	9,54E-08	3,03E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,59E-07	4,52E-07	4,07E-10	-8,45E-08
ADP-fossil	MJ, net calorific value	8,09E+00	3,24E-01	6,13E+00	1,45E+01	5,68E-02	6,97E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,46E-02	1,13E-01	1,24E-03	-8,74E-01
WDP	m3 world eq. Deprived	3,99E-01	1,16E-03	9,11E-02	4,92E-01	2,03E-04	2,35E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,39E-04	1,14E-03	5,58E-05	-2,39E-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	4,23E-08	1,93E-09	-6,73E-09	3,75E-08	3,38E-10	1,62E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,64E-10	1,24E-09	8,20E-12	-7,24E-09
IRP	kBq U235 eq.	3,83E-02	1,36E-03	3,45E-02	7,42E-02	2,38E-04	3,88E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,97E-04	5,62E-04	5,10E-06	2,14E-03
ETP-fw	CTUe	6,93E+01	2,89E-01	3,17E-01	6,99E+01	5,06E-02	3,32E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,44E-02	4,85E-01	8,07E-04	-4,20E+00
HTP-c	CTUh	4,25E-09	9,37E-12	-5,83E-10	3,68E-09	1,64E-12	1,84E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,74E-12	1,18E-11	1,87E-14	-1,60E-11
HTP-nc	CTUh	7,26E-08	3,16E-10	1,62E-10	7,31E-08	5,54E-11	4,90E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,23E-11	5,62E-10	5,74E-13	2,43E-08
SQP	-	3,22E+00	2,81E-01	1,67E+00	5,17E+00	4,92E-02	2,67E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,21E-02	2,27E-01	2,61E-03	-1,93E-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	7,90E-04	8,20E-07	-7,74E-06	7,83E-04	1,44E-07	3,84E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,40E-07	3,40E-07	1,86E-09	-1,50E-05
NHWD	kg	1,78E-01	2,05E-02	3,37E-02	2,33E-01	3,60E-03	1,21E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,00E-03	3,30E-03	8,45E-03	-1,23E-02
RWD	kg	3,02E-05	2,13E-06	2,89E-05	6,12E-05	3,73E-07	3,18E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,21E-07	6,69E-07	8,17E-09	7,41E-07
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	1,61E-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	8,88E-01	4,05E-03	6,87E-01	1,58E+00	7,11E-04	8,12E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,18E-03	1,77E-02	1,01E-05	2,54E-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	8,88E-01	4,05E-03	6,87E-01	1,58E+00	7,11E-04	8,12E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,18E-03	1,77E-02	1,01E-05	2,54E-02
PENRE	MJ	8,60E+00	3,44E-01	6,61E+00	1,56E+01	6,03E-02	7,47E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,00E-01	1,20E-01	1,32E-03	-9,07E-01
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	8,60E+00	3,44E-01	6,61E+00	1,56E+01	6,03E-02	7,47E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,00E-01	1,20E-01	1,32E-03	-9,07E-01
SM	kg	7,27E-02	0,00E+00	7,72E-05	7,27E-02	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	1,20E-02	3,94E-05	1,14E-02	2,34E-02	6,92E-06	1,15E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,15E-05	5,36E-05	1,33E-06	-4,53E-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 Collection and Sources
Data flows have been modeled as realistically as possible. Primary data from Walraven's production facility in the Czech Republic was used wherever available. When supplier-specific data was incomplete or unavailable, representative background data from verified databases was selected, prioritizing geographic and technological relevance. For Module A1, product composition data was obtained directly from internal documentation. Module A2 incorporates actual transport distances from suppliers to the production facility. Module A3 reflects site-specific energy consumption, production waste, and emissions from the year 2023/2024. All background processes were sourced from the Nationale Milieudatabase v3.8, based on Ecoinvent 3.6.

Data Collection Period
The dataset represents production processes in 2023/2024.

Methodology and Standards
This LCA was conducted in accordance with EN 15804+A2:2019, ISO 14040, ISO 14044, ISO 14025, and NMD Bepalingsmethode v1.2 (2025). All modelling and calculations were performed using Ecochain Helix software (version 4.3.1). The life cycle stages considered include A1–A3 for raw material supply, transport, and manufacturing; A4–A5 for transport to the construction site and installation; C1–C4 for end-of-life stages including deconstruction, transport, treatment, and disposal; and D for potential reuse, recovery, and recycling benefits.

Inventory and Allocation
All relevant materials, energy inputs, emissions, and packaging were included. System boundaries were defined according to EN 15804+A2, and allocation of shared manufacturing inputs was performed using mass-based allocation. No secondary materials were used during production. Cut-off criteria were applied to ensure excluded flows do not exceed 5 % of mass or energy per module.

Background Datasets
Primary data includes material composition, energy consumption, transport logistics, and emissions from Walraven's Czech facility. Transport distances include steel supply from various sources and zinc coating at 100 km. Where supplier-specific data was not available, background datasets from Ecoinvent 3.6 and Nationale Milieudatabase v3.8 were used for key materials such as steel, zinc, screws, and auxiliary substances. All background datasets include infrastructure and capital goods and were selected following NMD methodological rules.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Modules A1 to A3 represent the cradle-to-gate stages of the product's life cycle. Module A1 models the sourcing and processing of raw materials for the Walraven Hinged Pipe Clamp 400 square BUP 80mm. The clamp consists primarily of steel components, zinc coating, and Class 4.8 screws. The material composition is based on the 2023/2024 bill of materials and modeled using datasets from the Nationale Milieudatabase (NMD) v3.8 and Ecoinvent v3.6. Steel is modeled with a standard composition of 57% primary and 43% secondary content, consistent with Dutch LCA practice. No substances of very high concern (SVHC) are present.

Module A2 addresses the inbound transport of raw materials to the Walraven production facility in the Czech Republic. All transport flows were modeled in accordance with EN 15804+A2 using a 50% load factor (fully loaded inbound, empty return). Road transport distances for steel and other components are modeled using the 0001-tra&Transport, vrachtwagen reference from NMD v3.8 / Ecoinvent v3.6.

Module A3 captures the manufacturing phase at Walraven's Czech facility, using site-specific energy, waste, and emissions data from the 2023/2024 production year. Electricity is sourced from the Czech grid; lubricating oil and other auxiliary materials are included. Steel scrap generated during manufacturing is internally recycled. Zinc treatment electricity use is also included. Capital goods are excluded under EN 15804+A2's 5% cutoff rule.

Module A4 covers the transport of finished clamps to installation locations. A standard 150 km one-way distance is assumed, using a 50% load factor, and modeled using NMD v3.8 freight transport references. This assumption is consistent with Bepalingsmethode v1.2 guidelines.

Module A5 includes the installation process. Installation is carried out manually and does not require energy. A 5% material loss is assumed due to onsite handling inefficiencies. Packaging waste and installation losses are included and sent to relevant waste treatment processes: steel and zinc waste is transported 100 km to landfill/recycling; any plastic (if present) is sent 100 km to incineration. Emissions are calculated based on ton-kilometers.

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 manual deconstruction of the clamp with no energy consumption. Module C2 covers transport of waste materials: steel and zinc are transported 50 km to recycling or disposal sites, and any plastic components (e.g., from packaging or auxiliary parts) are transported 100 km to incineration facilities. Emissions for transport are modeled using standard freight transport references.

Module C3 addresses waste processing. All steel and zinc components are fully sorted and recycled, while any plastics or rubber are completely incinerated with energy recovery. Module C4 accounts for final disposal: 5 % of steel and zinc are sent to landfill, whereas incineration residues from plastics are not landfilled. All waste management follows the Dutch Bepalingsmethode v1.2 (2025).

Module D models benefits beyond the product's life cycle. Steel is credited with a 52 % substitution efficiency, reflecting 95 % recycling minus 43 % secondary content already in use. Zinc is credited at 95 % recycling efficiency. Plastics and rubber achieve 100 % energy substitution when incinerated at AVI plants.

This environmental modeling complies fully with EN 15804+A2:2019 + AC:2021 and the Bepalingsmethode v1.2 (2025), applying a complete, modular life cycle assessment using verified datasets for all components.

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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