walraven

Environmental Product Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:
Walraven HD1501 white EPDM 1/2" 72-78mm

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

MRPI® registration:
1.1.00934.2025

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ECO PLATFORM EPD VERIFIED

MRPI milieu relevante product informatie

COMPANY INFORMATION

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PRODUCT

Walraven HD1501 white EPDM 1/2" 72-78mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

DESCRIPTION OF PRODUCT

The Walraven HD1501 white EPDM 1/2" 72-78mm is a heavy-duty, two-part pipe clamp with two locking bolts and a captive nut (up to 5") hidden in a plastic holder. Made of steel with a white (RAL 9003) epoxy powder coating, it features anti-loss washers and a CO_2 welded connection nut. Part of the BIS UltraProtect® 1000 system, it is suitable for indoor and outdoor use, corrosion-tested to ISO 9227, sound insulating to DIN 4109, and fire safety tested.

MRPI® REGISTRATION

1.1.00934.2025

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.

VISUAL PRODUCT

PROGRAM OPERATOR

Stichting MRPI®

Kingsfordweg 151

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Amsterdam

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 HD1501 white EPDM 1/2" 72-78mm is a robust, two-part pipe clamp engineered for secure fastening in both indoor and outdoor applications. It features two locking bolts, with a captive nut (up to and including 5") secured in a durable plastic holder to simplify installation. The heavy-duty steel construction is finished with a white (RAL 9003) epoxy powder coating (60 µm), providing both aesthetic appeal and long-term corrosion resistance. Anti-loss washers, a CO_2 welded connection nut, and sound-insulating properties compliant with DIN 4109 are incorporated. The clamp is fire safety tested and designed to withstand at least 1,000 hours of salt spray testing (maximum 5% red rust) in accordance with ISO 9227.

Manufacturing Location
The clamp is produced in the Cista, Czech Republic using precision manufacturing processes that comply with environmental standards.

Manufacturing Process Overview
Steel coil processing ensures that high-quality steel is prepared to precise tolerances for strength and stability. Clamp halves are shaped using precision tooling, and locking bolts are installed with anti-loss washers. The CO_2 welding process secures the connection nut to ensure strength and reliability. Surface protection is provided by a 60 µm white epoxy powder coating (RAL 9003), enhancing corrosion resistance and providing a clean finish. Captive nut holders and bolts are pre-installed to simplify on-site 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), 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 white epoxy powder coating, combined with the BIS UltraProtect® 1000 system, ensures long service life even under demanding conditions. Steel and polymer components are fully recyclable at the end of their lifecycle. Scrap and offcut materials generated during production are recycled internally to reduce waste.

Installation and Use Phase
The captive nut design up to 5" simplifies pipe alignment and fastening. Noise control is achieved in compliance with DIN 4109, reducing structure-borne sound transmission through pipe supports. The clamp is durable and suitable for both indoor and outdoor applications, with proven performance in corrosion and fire safety tests. The necessary internal transport of Czech Republic to Netherlands has been accounted in the production process of A1-A3.

End-of-Life Considerations
Clamp components can be easily disassembled and recycled through standard metal and plastic recycling streams, supporting sustainable disposal and material recovery.

Name - Half parts	
Steel - Lower part	
Steel - Upper part	
Steel - Hollow pan head screw	
Steel - BISMAT Hammer	
Rubber - EPDM	

Total Weight	369 g

Component (> 1%)	(%)
Steel (combined)	
Rubber - EPDM	

SCOPE AND TYPE

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

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

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

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

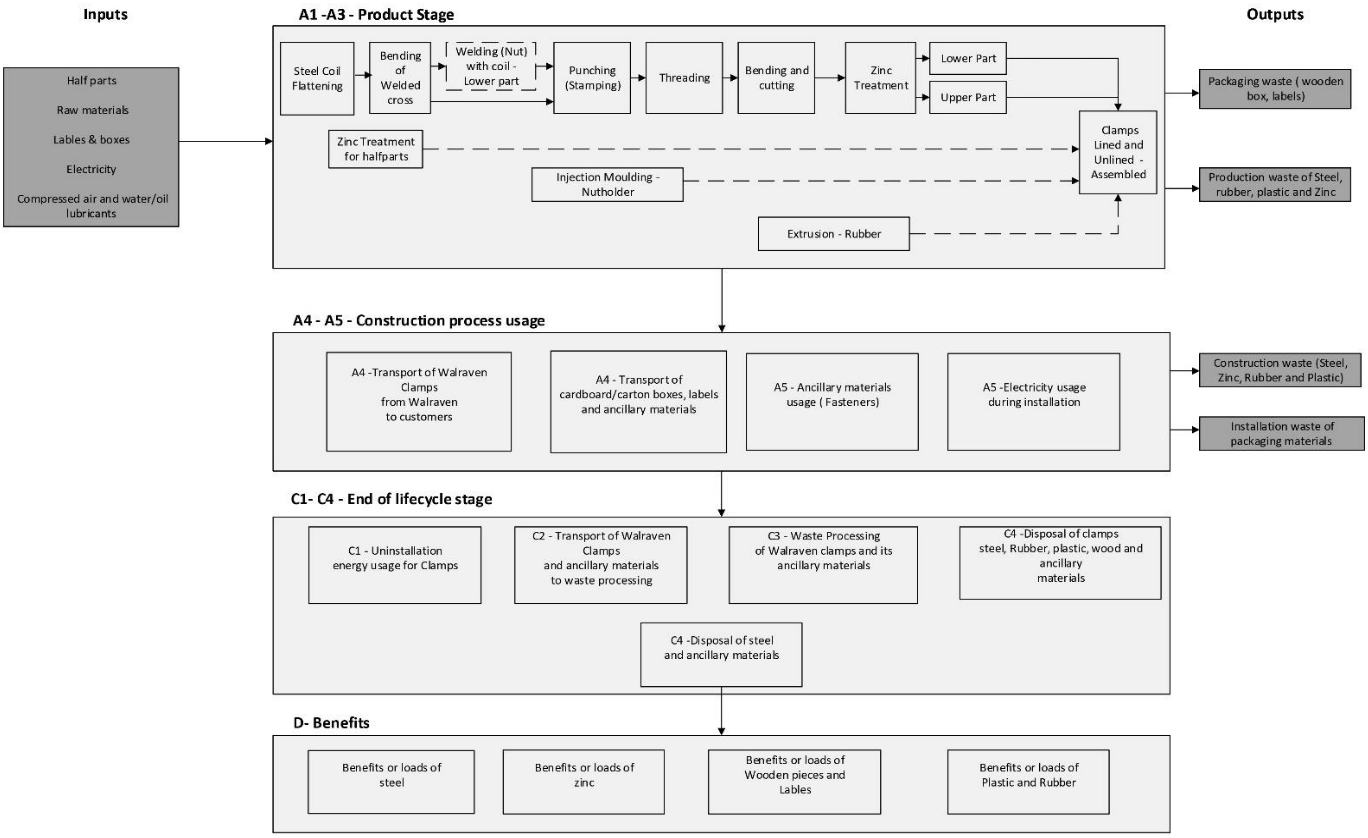
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental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

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

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport gate to site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse - Recovery - Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
x	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x

X = Modules Assessed

ND = Not Declared


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

REPRESENTATIVENESS

The aggregation was done by choosing the reference product as Walraven HD1501 white EPDM 1/2" 72-78mm. The remaining products which are aggregated in the same group by following the 20% allocation and worst-case scenario approach as per EN 15804+A2 and NMD Bepalingsmethode v1.2 (2025) are listed below:

Walraven HD1501 Clamp BUP EPDM 1/2" 79-85mm
Walraven 2S Clamp zinc plated EPDM M8/10 184-194mm
Walraven BISMAT SX Socket 90 mm
Walraven 2S Clamp set zinc plated EPDM M8/10 163-172mm
Walraven HD1501 white EPDM M10/12 79-85mm
Walraven Spiral Duct Clamp Stainless steel EPDM M8 355mm
Walraven 2S Clamp zinc plated EPDM M8/10 173-183mm
Walraven HD1501 Clamp BUP EPDM M10/12 79-85mm
Walraven HD1501 Clamp BUP EPDM 1/2" 72-78mm
Walraven HD1501 white EPDM M10/12 72-78mm
Walraven 2S Clamp zinc plated EPDM M8/10 163-172mm
Walraven BISMAT® SL Socket Clamp M10 GA zinc plated DN70 78mm
Walraven Spiral Duct Clamp Stainless steel EPDM M8 315mm
Walraven HD1501 white EPDM 1/2" 72-78mm
Walraven KSB2 Clamp zinc plated EPDM UNC 3/8"-1/2" 165-169mm
Walraven BISMAT® SL Socket Clamp M10 KA zinc plated 90mm
Walraven HD1501 Clamp BUP EPDM 1/2" 65-71mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 165-169mm
Walraven HD1501 Clamp BUP EPDM M10/12 72-78mm
Walraven HD1501 white EPDM M10/12 65-71mm
Walraven HD1501 Clamp BUP EPDM M10/12 65-71mm
Walraven HD1501 white EPDM 1/2" 65-71mm
Walraven HD1501 white EPDM M10/12 108-116mm
Walraven HD1501 Clamp BUP EPDM 1/2" 59-64mm
Walraven HD1501 Clamp BUP EPDM M10/12 108-116mm
Walraven HD1501 white EPDM M8/10 40-45mm
Walraven HD1501 white EPDM M8/10 25-29mm
Walraven HD1501 white EPDM 1/2" 132-140mm
Walraven Spiral Duct Clamp Stainless steel EPDM M8 250mm
Walraven HD1501 Clamp BUP EPDM M8/10 25-29mm
Walraven HD1501 white EPDM 1/2" 101-109mm
Walraven HD1501 white EPDM 1/2" 19-23mm
Walraven HD1501 Clamp BUP EPDM 1/2" 101-109mm
Walraven HD1501 Clamp BUP EPDM M8/10 40-45mm
Walraven HD1501 Clamp BUP EPDM 1/2" 19-23mm
Walraven HD1501 white EPDM M10/12 101-109mm
Walraven KSB2 Clamp zinc plated EPDM UNC 3/8"-1/2" 219-225mm
Walraven 2S Clamp set zinc plated EPDM M8/10 154-162mm
Walraven HD1501 Clamp BUP EPDM M10/12 101-109mm
Walraven HD1501 Clamp BUP EPDM 1/2" 132-140mm
Walraven HD1501 Clamp BUP EPDM M10/12 132-140mm
Walraven HD1501 white EPDM M10/12 132-140mm
Walraven BISMAT® 2000 Clamp 3/8 1/2 IP 5" 133-141mm
Walraven HD1501 white EPDM 1/2" 125-133mm
Walraven Two-Screw Clamp Stainless EPDM M8/10 159-165mm
Walraven HD1501 Clamp BUP EPDM 1/2" 125-133mm
Walraven KSB2 Clamp zinc plated EPDM M8/10/1/2" 152-160mm
Walraven HD1501 Clamp BUP EPDM M10/12 125-133mm
Walraven HD1501 white EPDM 1/2" 59-64mm
Walraven HD1501 white EPDM M8/10 59-64mm
Walraven HD1501 white EPDM 1/2" 30-35mm

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.	1,15E-02	1,71E-06	7,67E-06	1,15E-02	1,89E-07	5,74E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,42E-07	4,53E-07	7,71E-10	-7,21E-06
ADPF	MJ	1,83E+01	1,07E+00	8,75E+00	3,07E+04	1,13E-01	1,26E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,64E-01	1,18E-01	2,34E-03	-3,48E+00
GWP	kg CO2 eq.	1,21E+00	7,11E-02	6,66E-01	1,95E+00	7,41E-03	8,91E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,73E-02	4,75E-02	8,27E-05	-2,41E-01
ODP	kg CFC11 eq.	9,04E-08	1,25E-08	3,79E-08	1,41E-07	1,31E-09	6,75E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,07E-09	1,29E-09	2,75E-11	-1,15E-08
POCP	kg ethene eq.	1,11E-03	4,71E-05	-3,97E-04	7,63E-04	4,47E-06	1,40E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,04E-05	7,30E-06	8,81E-08	-5,05E-04
AP	kg SO2 eq.	6,87E-03	4,38E-04	2,26E-03	9,57E-03	3,26E-05	4,46E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,60E-05	8,29E-05	6,05E-07	-8,39E-04
EP	kg (PO4) 3 eq.	9,87E-04	7,29E-05	5,05E-04	1,56E-03	6,40E-06	7,49E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,49E-05	1,13E-05	1,17E-07	-9,93E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	2,31E+00	3,07E-02	-9,52E-02	2,24E+00	3,12E-03	1,06E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,28E-03	1,01E-02	3,74E-05	-1,46E-01
FAETP	kg DCB eq.	3,85E-02	8,55E-04	3,32E-03	4,27E-02	9,10E-05	2,24E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,12E-04	2,13E-04	8,87E-07	1,54E-03
MAETP	kg DCB eq.	7,24E+01	3,14E+00	1,77E+01	9,31E+01	3,27E-01	4,80E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,64E-01	8,69E-01	3,17E-03	8,35E-01
TETP	kg DCB eq.	1,42E-02	1,07E-04	3,46E-03	1,78E-02	1,10E-05	1,47E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,57E-05	3,26E-05	9,39E-08	1,15E-02
ECI	euro	3,19E-01	9,25E-03	4,02E-02	3,69E-01	8,93E-04	1,73E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,08E-03	3,84E-03	1,17E-05	-2,99E-02
ADPF	kg Sb eq.	8,83E-03	5,15E-04	4,21E-03	1,47E+01	5,45E-05	6,06E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,27E-04	5,67E-05	1,13E-06	-1,67E-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.	1,25E+00	7,17E-02	6,54E-01	1,98E+00	7,48E-03	8,96E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,74E-02	4,06E-02	8,43E-05	-2,57E-01
GWP-fossil	kg CO2 eq.	1,24E+00	7,17E-02	6,52E-01	1,97E+00	7,47E-03	8,91E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,74E-02	4,76E-02	8,42E-05	-2,58E-01
GWP-biogenic	kg CO2 eq.	5,32E-03	2,60E-05	1,27E-03	6,61E-03	2,79E-06	3,46E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,50E-06	-6,97E-03	4,93E-08	0,00E+00
GWP-luluc	kg CO2 eq.	2,54E-03	2,81E-05	7,95E-04	3,37E-03	2,74E-06	1,77E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,39E-06	9,61E-06	2,35E-08	1,61E-04
ODP	kg CFC11 eq.	9,28E-08	1,57E-08	2,87E-08	1,37E-07	1,65E-09	6,69E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,85E-09	1,45E-09	3,47E-11	-1,03E-08
AP	mol H+ eq.	8,47E-03	5,70E-04	2,68E-03	1,17E-02	4,33E-05	5,48E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,01E-04	1,04E-04	8,00E-07	-1,02E-03
EP-fresh water	kg PO4 eq.	9,72E-05	6,88E-07	1,23E-04	2,21E-04	7,54E-08	1,06E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,76E-07	5,68E-07	9,44E-10	-9,08E-06
EP-marine	kg N eq.	1,78E-03	1,81E-04	3,52E-04	2,31E-03	1,53E-05	1,10E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,56E-05	2,38E-05	2,75E-07	-1,85E-04
EP-terrestrial	mol N eq.	1,97E-02	2,00E-03	4,38E-03	2,61E-02	1,68E-04	1,24E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,93E-04	2,75E-04	3,03E-06	-2,16E-03
POCP	kg NMVOC eq.	6,38E-03	5,57E-04	1,59E-04	7,09E-03	4,81E-05	2,95E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,12E-04	7,45E-05	8,81E-07	-1,44E-03
ADP-minerals & metals	kg Sb eq.	1,15E-02	1,71E-06	7,67E-06	1,15E-02	1,89E-07	5,74E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,42E-07	4,53E-07	7,71E-10	-7,21E-06
ADP-fossil	MJ, net calorific value	1,67E+01	1,07E+00	1,01E+01	2,79E+01	1,13E-01	1,30E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,63E-01	1,20E-01	2,36E-03	-2,32E+00
WDP	m3 world eq. Deprived	7,86E-01	3,66E-03	1,82E-01	9,71E-01	4,03E-04	4,57E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,40E-04	1,88E-03	1,06E-04	-6,01E-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.

ECO PLATFORM EPD VERIFIED

MRPI milieu relevante product informatie

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	8,23E-08	6,09E-09	-2,06E-08	6,78E-08	6,71E-10	2,82E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,57E-09	1,25E-09	1,55E-11	-1,49E-08
IRP	kBq U235 eq.	7,78E-02	4,48E-03	6,32E-02	1,45E-01	4,72E-04	7,49E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,10E-03	5,81E-04	9,66E-06	2,14E-03
ETP-fw	CTUe	1,32E+02	9,33E-01	-2,66E+00	1,30E+02	1,00E-01	6,15E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,34E-01	6,25E-01	1,53E-03	-8,30E+00
HTP-c	CTUh	8,07E-09	3,20E-11	-1,60E-09	6,50E-09	3,26E-12	3,24E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,61E-12	1,33E-11	3,53E-14	-4,05E-11
HTP-nc	CTUh	1,38E-07	1,01E-09	-2,96E-09	1,36E-07	1,10E-10	9,14E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,56E-10	5,98E-10	1,09E-12	4,57E-08
SQP	-	6,36E+00	8,72E-01	2,76E+00	9,99E+00	9,77E-02	5,03E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,28E-01	2,24E-01	4,94E-03	-4,76E-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.

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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	1,50E-03	2,58E-06	-2,45E-05	1,47E-03	2,85E-07	7,24E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,66E-07	3,67E-07	3,52E-09	-2,87E-05
NHWD	kg	3,42E-01	6,32E-02	5,43E-02	4,60E-01	7,15E-03	2,40E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,67E-02	4,06E-03	1,60E-02	-2,46E-02
RWD	kg	6,31E-05	7,04E-06	5,24E-05	1,23E-04	7,40E-07	6,23E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,73E-06	6,83E-07	1,55E-08	-1,02E-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	4,32E-04	4,32E-04	0,00E+00	2,16E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	3,04E-01	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	2,62E-05	2,62E-05	0,00E+00	1,31E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	1,31E-02	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	1,51E-03	1,51E-03	0,00E+00	7,55E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,07E-01
ETE	MJ	0,00E+00	0,00E+00	8,78E-04	8,78E-04	0,00E+00	4,39E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,23E-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

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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	1,77E+00	1,29E-02	1,21E+00	3,00E+00	1,41E-03	1,52E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,29E-03	1,80E-02	1,90E-05	2,20E-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	1,77E+00	1,29E-02	1,21E+00	3,00E+00	1,41E-03	1,52E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,29E-03	1,80E-02	1,90E-05	2,20E-02
PENRE	MJ	1,78E+01	1,13E+00	1,09E+01	2,98E+01	1,20E-01	1,39E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,79E-01	1,27E-01	2,50E-03	-2,42E+00
PENRM	MJ	3,46E-01	0,00E+00	0,00E+00	3,46E-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	1,81E+01	1,13E+00	1,09E+01	3,01E+01	1,20E-01	1,39E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,79E-01	1,27E-01	2,50E-03	-2,42E+00
SM	kg	1,38E-01	0,00E+00	1,26E-04	1,38E-01	0,00E+00	6,31E-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	2,37E-02	1,25E-04	2,10E-02	4,49E-02	1,37E-05	2,19E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,20E-05	1,04E-04	2,52E-06	-1,22E-03

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

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CALCULATION RULES

Data Quality

Data flows have been modeled as realistically as possible. The assessment follows the principle that primary data from processes occurring at the production site is prioritized. When primary data is unavailable, reliable reference data from established sources and databases is used to fill gaps.

For Module A1, detailed product composition data provided by the manufacturer was used. Module A2 includes transportation data for raw materials delivered to the production site. Module A3 incorporates energy consumption and waste data collected from production operations in 2023/2024 at Walraven's Czech Republic facility. Background processes were sourced from the Dutch Nationale Milieudatabase v3.8, based on Ecoinvent 3.6 datasets.

Data Collection Period

The dataset represents production processes during the 2023/2024 period, providing a current and relevant basis for the LCA.

Methodology and Reproducibility

The life cycle assessment has been developed in accordance with NEN-EN ISO 14040, 14044, and 14025, as well as EN 15804+A2:2019. The NMD Bepalingsmethode v1.2 (2025) methodology was applied for all calculations. Modeling and environmental impact computations were performed using Ecochain Helix software version 4.3.1. The assessment covers all relevant life cycle stages, including raw material supply, transport, manufacturing, distribution, installation, use, end-of-life processing, and potential benefits from reuse, recovery, and recycling.

Inventory and Allocation

Inputs, outputs, emissions, and energy flows were allocated according to the modular system boundaries defined in EN 15804+A2 and the NMD methodology. Mass-based allocation was used to distribute production site inputs among individual products. No secondary materials were used during production, and end-of-life assumptions reflect Dutch average routes for material recycling and waste treatment. Cut-off criteria ensure that untracked flows in any module do not exceed 5% of total mass or energy.

Data Sources

Primary data was obtained directly from Walraven's Czech production facility, covering material compositions, energy usage, transport distances, and packaging waste. In cases where supplier-specific data was unavailable, standard reference datasets from NMD v3.8 and Ecoinvent 3.6 were used to represent materials such as steel, EPDM rubber, polypropylene (PP), polyoxymethylene (POM), and zinc.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Modules A1 to A3 cover the cradle-to-gate life cycle stages. Module A1 models the raw material extraction and upstream processing. The clamp is composed of steel (including galvanized), EPDM rubber, POM plastic, and zinc. These materials are modeled using NMD v3.8 and Ecoinvent v3.6 databases. Where specific data was unavailable, generic references were used. Steel input assumes a composition of 57% primary and 43% secondary content as per standard practice under EN 15804+A2.

Module A2 includes the transport of materials to the production facility in the Czech Republic. Transport distances were derived from supplier data, with modes including road (truck) and ship. For example, EPDM rubber was transported ~1,600 km by road, and steel up to ~4,150 km. All transport is modeled with a 50% average load factor and emissions calculated using 0001-tra&Transport, vrachtwagen from NMD v3.8.

Module A3 models the production process, incorporating direct site data from the 2023/2024 production year. This includes the use of grid electricity, energy for zinc treatment, lubricating oil, and all packaging and process emissions. Production waste (steel and rubber) is recorded and modeled for recycling or incineration. Capital goods were not included, as their environmental impact is below the 5% threshold under the cutoff rule in EN 15804+A2.

Module A4 includes transport of the finished clamp from the production facility to the site of installation. A 150 km transport distance by truck was assumed, with a 50% load factor (full to site, empty return), using NMD/Ecoinvent datasets.

Module A5 accounts for the installation phase. Installation is manual and does not involve energy use. A 5% material loss for steel, rubber, and plastic components is assumed, and packaging waste is also included. All installation waste is sent to the appropriate waste treatment streams as follows:

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

Module C1 – Deconstruction
Module C1 models the manual dismantling of the clamp, assuming negligible energy consumption. No machinery or additional energy inputs are required during this stage, reflecting typical end-of-life handling practices for such products.

Module C2 – Transport to Waste Processing
Module C2 covers the transport of waste materials to processing facilities. Steel and zinc are transported 50 kilometers to recycling or landfill sites, while rubber and plastic are transported 100 kilometers to AVI incineration plants. Emissions from these transports are modeled using the same truck datasets as those applied in earlier life cycle stages, ensuring consistency in the LCA modeling approach.

Module C3 – Waste Treatment
Module C3 addresses the treatment of waste materials. Steel and zinc are assumed to be fully sorted and recycled, with recycling rates modeled between 95 and 100 percent. Rubber and plastic are incinerated with energy recovery. The emission factors used in this modeling are sourced from NMD v3.8, including 0264-avC&Verbranden kunststoffen for plastics, 0260-avC&Verbranden rubber/EPDM for rubber, and 0315-reC&Sorteren en persen oud ijzer for steel.

Module C4 – Final Disposal
Module C4 models the final disposal of residual materials. Five percent of steel and zinc are sent to landfill, while the remaining 95 percent is recycled. Rubber and plastic are assumed to be fully incinerated with no landfill allocation. The NMD v3.8 disposal datasets used include 0253-sto&Stort staal for steel and 0248-sto&Stort koper, lood, verzinkt staal, zink for zinc.

Module D – Benefits Beyond the System Boundary
Module D captures the environmental benefits beyond the system boundary. Steel recycling is credited with a 52 percent substitution benefit, calculated by subtracting the 43 percent secondary content from the 95 percent recycling rate. Zinc recycling is modeled with a 95 percent efficiency, and rubber and plastic incineration is assumed to deliver 100 percent energy recovery, reducing reliance on fossil fuels.

The entire life cycle modeling, covering Modules C1 to D, is fully compliant with EN 15804+A2:2019 + AC:2021 and follows the Dutch Bepalingsmethode v1.2 (2025). This approach ensures alignment with current European and national best practices for environmental product 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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