walraven

Environmental Product Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:

Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 20-23mm

Provided by:

J. van Walraven Holding B.V.

MRPI® registration:

1.1.00931.2025

Program operator:

Stichting MRPI®

Publisher:

Stichting MRPI®

www.mrpi.nl

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15-5-2030

ECO PLATFORM EPD VERIFIED

MRPI milieu relevante product informatie

COMPANY INFORMATION

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MRPI® REGISTRATION

1.1.00931.2025

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 BISMAT® 2000 Clamp zinc plated EPDM M8/10 20-23mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

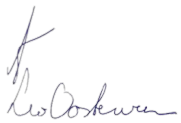
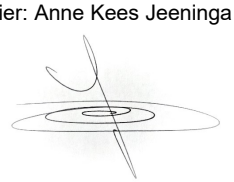
DESCRIPTION OF PRODUCT

The Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 20-23mm is a single-screw pipe clamp designed for quick, secure, and low-noise installation. Featuring the Walraven BISMAT® quick-locking system and an EPDM lining compliant with DIN 4109, it provides up to 23 dB(A) noise reduction. Made of zinc-plated steel and tested for fire safety, it's ideal for indoor pipe installations requiring acoustic performance.

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 BISMAT® 2000 Clamp zinc plated EPDM M8/10 20-23mm is a high-performance, single-screw pipe clamp designed for quick and secure mounting of steel, copper, cast iron, and multilayer pipes (e.g., Ø 20–23 mm) in residential, commercial, and light industrial applications. Featuring Walraven's BISMAT® quick-locking mechanism, it enables tool-free installation with one hand, improving efficiency during fitting. The integrated EPDM rubber lining reduces structure-borne and airborne sound in compliance with DIN 4109 and ISO 3822-1, offering up to 23 dB(A) noise attenuation. Its zinc-plated steel construction ensures long-term durability and corrosion resistance, while the clamp is fire-tested for added safety in technical environments.

Manufacturing Location:
Produced at Walraven's facility in the Borovince, Czech Republic, following certified quality and environmental management systems.

Manufacturing Process Overview:
The clamp body begins with precision-cut and flattened steel coils, ensuring consistent strength and dimensional accuracy from the start. Automated stamping and forming machines then shape the clamp and create the bend features required for the single-screw locking system. An M8/M10 threaded nut is attached using resistance welding, providing a secure, load-bearing connection that holds up under demanding conditions. To protect against corrosion, the clamp undergoes zinc electroplating per ISO 9227, achieving at least 1,000 hours of salt spray resistance with less than 5% red rust. A two-component EPDM rubber lining is integrated to support proper pipe positioning and acoustic dampening, meeting DIN 4109 requirements and tested to ISO 3822-1. In the final assembly stage, each clamp is fitted with a pre-mounted locking screw, a captive polypropylene nut holder, and a POM anti-loss washer, reducing installation time and minimizing material waste on the job site.
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 (Modules A1–A3):
Raw Material Inputs (A1): Based on the 2023–2024 bill of materials, the clamp is made primarily of steel (with 57% primary and 43% secondary content), EPDM rubber lining (approx. 7.02 g), polypropylene (PP), and polyoxymethylene (POM) plastic.

Data Sources: Material modeling references National Milieudatabase (NMD) v3.8 and Ecoinvent v3.6 databases. Where specific product data was not available, representative generic datasets were used.

Processing (A2-A3): Clamp production accounts for material transformation, coating, and assembly processes. Water and lubricant usage is included, as well as recyclable packaging inputs.

Corrosion Resistance: The zinc finish minimizes environmental degradation, ensuring extended service life without additional treatments.

Low Emissions: The clamp materials are VOC-free, supporting healthier indoor air quality.

Installation and Use Phase:
Quick Installation: The BISMAT® quick-lock system allows rapid, one-handed installation without tools, reducing labor time and improving safety. The necessary internal transport of Czech Republic to Netherlands has been accounted in the production process of A1-A3.

Noise and Vibration Control: The EPDM lining offers effective sound attenuation (up to 23 dB(A)) and vibration damping, improving occupant comfort and acoustic performance.

Versatile Application: Designed for indoor and light-duty sheltered outdoor use across residential, commercial, and utility building sectors.

End-of-Life Considerations:
Disassembly: All components can be separated manually for recycling, including the steel body, rubber lining, and plastic fasteners.

Recyclability: All core materials steel, EPDM, PP, and POM are recyclable via standard industrial recovery routes.

Module D Impact: Environmental offsets from recycled steel and plastic inputs are accounted for in Module D in accordance with EN 15804+A2.

Packaging and Transport:
Packaging: Delivered in recyclable cardboard packaging.

Transport Modeling: Distribution is modeled based on an average 250 km transport distance via Euro 5 freight trucks (in line with EN 15804 guidance).

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

Total Weight	54 g

Component (> 1%)	(%)
Steel (combined)	80,85%
Rubber - EPDM	16,73%

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.

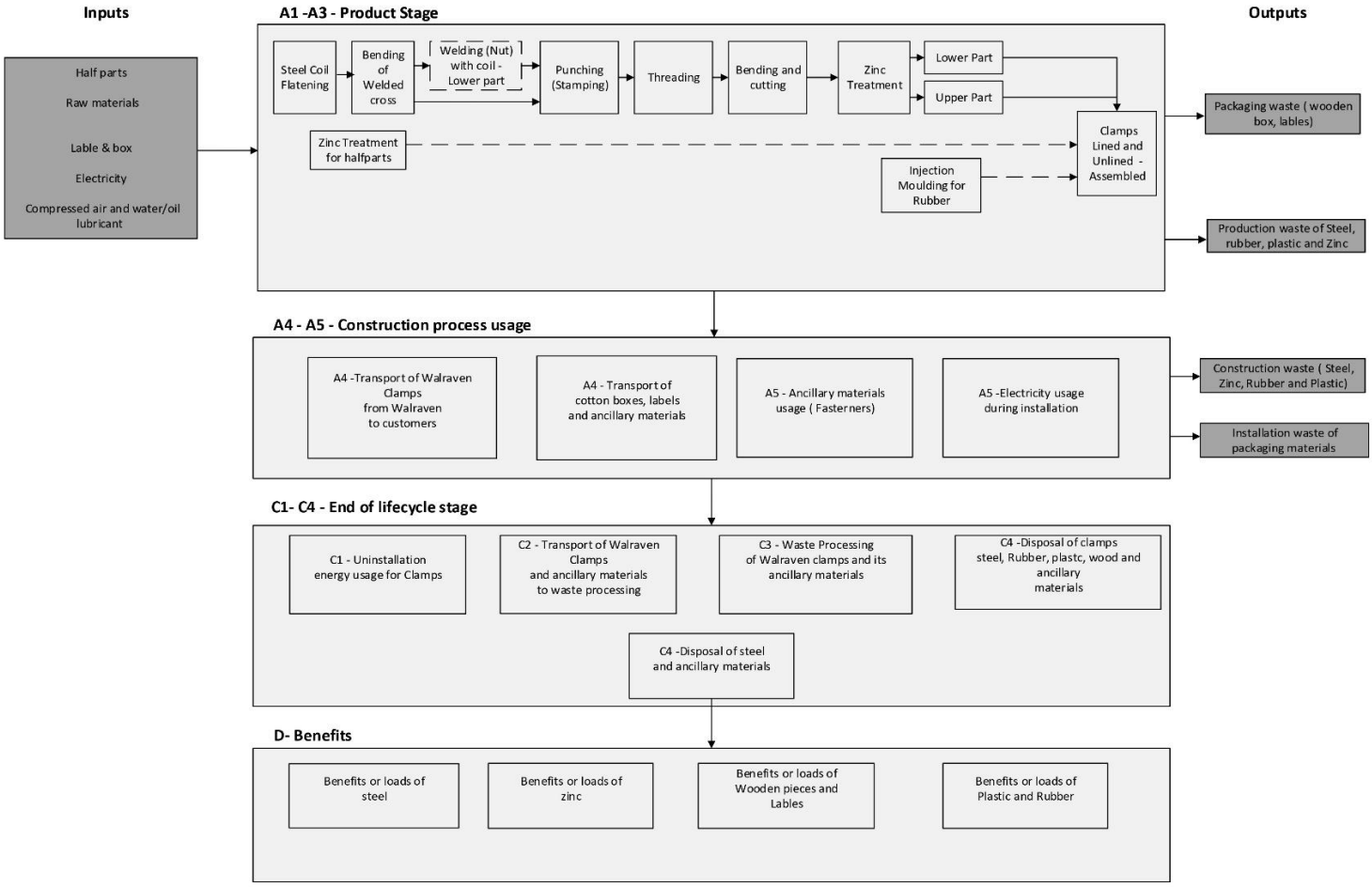
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental 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 BISMAT® 2000 Clamp zinc plated EPDM M8/10 20-23mm. 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 KSB1 Clamp zinc plated EPDM M8 13-14mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 25-28mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8 25-28mm
Walraven BISMAT® Flash Clamp M8 25-28 mm
Walraven BISMAT® Flash Clamp zp EPDM 31-35mm UNC 3/8" IPS 1" CTS 1 1/4
Walraven KSB1 Clamp zinc plated EPDM M8 32-35mm
Walraven KSB1 Clamp zinc plated EPDM M8 20-23mm
Walraven BISMAT® Flash Clamp zp EPDM 25-28mm UNC 3/8" IPS 3/4" CTS 1"
Walraven KSB1 Clamp zinc plated EPDM M8 15-18mm
Walraven KSB1 Clamp zinc plated EPDM M8 25-28mm
Walraven 2S Clamp zinc plated EPDM M8/10 25-30mm
Walraven 2S Clamp zinc plated EPDM M8 31-37mm
Walraven BISMAT® 2000 Clamp zinc plated Silicon M8/10 20-23mm
Walraven BISMAT® 5000 zinc plated EPDM green M8 25mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 20-23mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 11-14mm
Walraven BISMAT® Flash Clamp M8 25-28 mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8/10 20-23mm
Walraven BISMAT® 2000 Clamp zinc plated Silicon M8/10 15-18mm
Walraven 2S Clamp zinc plated EPDM M8 25-30mm
Walraven 2S Clamp zinc plated EPDM M8/10 20-24mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 15-18mm
Walraven BISMAT® 5000 zinc plated EPDM green M8 20mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8/10 15-18mm
Walraven BISMAT® Flash Clamp zp EPDM 20-23mm UNC 3/8" IPS 1/2" CTS 3/4
Walraven 2S Clamp zinc plated EPDM M8/10 15-19mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 20-23mm
Walraven BISMAT® 5000 zinc plated EPDM green M8 16mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8 20-23mm
Walraven BISMAT® Flash Clamp M8 20-23 mm
Walraven 2S Clamp zinc plated EPDM M8 20-24mm
Walraven 2S Clamp zinc plated EPDM M8/10 10-14mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 15-18mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8 15-18mm
Walraven BISMAT® Flash Clamp M8 15-18 mm
Walraven BISMAT® Flash Clamp zp EPDM 15-18mm UNC 3/8" IPS 3/8" CTS 1/2
Walraven 2S Clamp zinc plated EPDM M8 15-19mm
Walraven 2S Clamp zinc plated EPDM M8 10-14mm

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.	1,22E-03	1,87E-07	3,56E-07	1,22E-03	2,77E-08	6,10E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,46E-08	1,41E-08	8,18E-11	-4,94E-06
ADPF	MJ	2,38E+00	1,12E-01	4,20E-01	2,92E+00	1,66E-02	1,16E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,87E-02	5,96E-03	2,48E-04	-6,51E-01
GWP	kg CO2 eq.	1,44E-01	7,32E-03	3,21E-02	1,84E-01	1,08E-03	8,74E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,53E-03	2,23E-02	8,77E-06	-3,47E-02
ODP	kg CFC11 eq.	1,28E-08	1,30E-09	1,77E-09	1,59E-08	1,92E-10	6,60E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,49E-10	6,79E-11	2,92E-12	-3,40E-09
POCP	kg ethene eq.	1,35E-04	4,41E-06	-1,39E-05	1,26E-04	6,54E-07	3,13E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,53E-06	2,77E-07	9,34E-09	-6,57E-05
AP	kg SO2 eq.	8,04E-04	3,22E-05	1,12E-04	9,49E-04	4,77E-06	4,17E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,11E-05	4,28E-06	6,41E-08	-1,35E-04
EP	kg (PO4) 3 eq.	1,14E-04	6,32E-06	2,45E-05	1,45E-04	9,36E-07	6,64E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,18E-06	9,90E-07	1,24E-08	-1,60E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	2,51E-01	3,08E-03	-2,86E-03	2,51E-01	4,56E-04	1,17E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,06E-03	3,24E-04	3,96E-06	-1,98E-02
FAETP	kg DCB eq.	4,26E-03	8,99E-05	1,61E-04	4,52E-03	1,33E-05	2,32E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,11E-05	8,71E-06	9,41E-08	6,66E-05
MAETP	kg DCB eq.	8,23E+00	3,23E-01	8,41E-01	9,40E+00	4,79E-02	4,67E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,12E-01	2,91E-02	3,36E-04	-2,41E-01
TETP	kg DCB eq.	1,55E-03	1,09E-05	1,57E-04	1,71E-03	1,61E-06	1,46E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,76E-06	2,04E-06	9,96E-09	1,21E-03
ECI	euro	3,57E-02	8,82E-04	2,12E-03	3,87E-02	1,31E-04	1,80E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,05E-04	1,18E-03	1,24E-06	-4,33E-03
ADPF	kg Sb eq.	1,15E-03	5,38E-05	2,02E-04	1,40E-03	7,97E-06	5,59E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,86E-05	2,87E-06	1,19E-07	-3,13E-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.	1,48E-01	7,38E-03	3,17E-02	1,87E-01	1,09E-03	8,84E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,55E-03	2,31E-02	8,94E-06	-3,66E-02
GWP-fossil	kg CO2 eq.	1,47E-01	7,38E-03	3,16E-02	1,86E-01	1,09E-03	8,79E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,55E-03	2,24E-02	8,94E-06	-3,66E-02
GWP-biogenic	kg CO2 eq.	6,04E-04	2,75E-06	5,94E-05	6,66E-04	4,08E-07	3,35E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,51E-07	7,01E-04	5,22E-09	0,00E+00
GWP-luluc	kg CO2 eq.	2,94E-04	2,70E-06	3,76E-05	3,34E-04	4,01E-07	1,73E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,35E-07	3,17E-07	2,49E-09	9,58E-06
ODP	kg CFC11 eq.	1,38E-08	1,63E-09	1,31E-09	1,67E-08	2,41E-10	6,95E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,63E-10	7,55E-11	3,68E-12	-3,70E-09
AP	mol H+ eq.	9,88E-04	4,28E-05	1,34E-04	1,16E-03	6,34E-06	5,14E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,48E-05	5,59E-06	8,48E-08	-1,63E-04
EP-fresh water	kg P eq.	1,09E-05	7,44E-08	5,88E-06	1,69E-05	1,10E-08	7,79E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,57E-08	1,79E-08	1,00E-10	-1,34E-06
EP-marine	kg N eq.	2,02E-04	1,51E-05	1,80E-05	2,36E-04	2,23E-06	1,09E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,21E-06	1,74E-06	2,92E-08	-2,73E-05
EP-terrestrial	mol N eq.	2,25E-03	1,66E-04	2,18E-04	2,63E-03	2,46E-05	1,21E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,75E-05	1,96E-05	3,22E-07	-3,19E-04
POCP	kg NMVOC eq.	7,45E-04	4,75E-05	1,99E-05	8,12E-04	7,03E-06	3,22E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,64E-05	4,96E-06	9,34E-08	-1,96E-04
ADP-minerals & metals	kg Sb eq.	1,22E-03	1,87E-07	3,56E-07	1,22E-03	2,77E-08	6,10E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,46E-08	1,41E-08	8,18E-11	-4,94E-06
ADP-fossil	MJ, net calorific value	2,21E+00	1,11E-01	4,73E-01	2,80E+00	1,65E-02	1,16E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,85E-02	5,78E-03	2,50E-04	-5,38E-01
WDP	m3 world eq. Deprived	9,24E-02	3,98E-04	8,03E-03	1,01E-01	5,90E-05	4,42E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,38E-04	2,87E-04	1,12E-05	-1,29E-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	9,78E-09	6,63E-10	-7,53E-10	9,69E-09	9,82E-11	3,92E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,29E-10	4,52E-11	1,65E-12	-2,23E-09
IRP	kBq U235 eq.	9,74E-03	4,66E-04	2,94E-03	1,31E-02	6,91E-05	6,28E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,61E-04	2,17E-05	1,02E-06	-8,44E-04
ETP-fw	CTUe	1,43E+01	9,92E-02	-5,32E-02	1,44E+01	1,47E-02	6,70E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,43E-02	4,79E-02	1,62E-04	-1,08E+00
HTP-c	CTUh	8,59E-10	3,22E-12	-6,05E-11	8,02E-10	4,77E-13	3,97E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,11E-12	5,11E-13	3,75E-15	-9,63E-12
HTP-nc	CTUh	1,48E-08	1,09E-10	-6,13E-11	1,49E-08	1,61E-11	9,84E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,75E-11	2,86E-11	1,15E-13	4,72E-09
SQP	-	7,69E-01	9,65E-02	1,16E-01	9,82E-01	1,43E-02	4,62E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,34E-02	6,61E-03	5,24E-04	-1,13E-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	1,59E-04	2,82E-07	-9,19E-07	1,58E-04	4,18E-08	7,76E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,75E-08	2,64E-08	3,73E-10	-3,22E-06
NHWD	kg	3,76E-02	7,06E-03	2,69E-03	4,73E-02	1,05E-03	2,49E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,44E-03	5,97E-04	1,70E-03	-3,36E-03
RWD	kg	8,68E-06	7,31E-07	2,44E-06	1,19E-05	1,08E-07	5,37E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,53E-07	2,61E-08	1,64E-09	-1,49E-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-05	1,51E-05	0,00E+00	7,54E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	3,22E-02	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	9,16E-07	9,16E-07	0,00E+00	4,58E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	7,02E-03	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	3,07E-05	3,07E-05	0,00E+00	1,53E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,44E-02
ETE	MJ	0,00E+00	0,00E+00	5,27E-05	5,27E-05	0,00E+00	2,64E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,92E-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	2,07E-01	1,39E-03	5,09E-02	2,59E-01	2,06E-04	1,25E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,82E-04	5,74E-04	2,02E-06	-1,15E-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	2,07E-01	1,39E-03	5,09E-02	2,59E-01	2,06E-04	1,25E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,82E-04	5,74E-04	2,02E-06	-1,15E-02
PENRE	MJ	2,35E+00	1,18E-01	5,10E-01	2,98E+00	1,75E-02	1,24E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,08E-02	6,19E-03	2,65E-04	-5,68E-01
PENRM	MJ	1,91E-01	0,00E+00	0,00E+00	1,91E-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	2,54E+00	1,18E-01	5,10E-01	3,17E+00	1,75E-02	1,24E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,08E-02	6,19E-03	2,65E-04	-5,68E-01
SM	kg	1,46E-02	0,00E+00	4,41E-06	1,46E-02	0,00E+00	2,21E-07	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	2,76E-03	1,36E-05	9,76E-04	3,75E-03	2,01E-06	1,73E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,69E-06	2,98E-05	2,67E-07	-3,14E-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 2023/2024.

Methodology and Reproducibility:
The data regarding all materials, including rubber and steel components, was collected from the Walraven Czech Republic production facility through internal administrative and technical data templates. When suppliers did not deliver sufficient information on material compositions or transport distances, alternative data sources such as the Nationale Milieudatabase v3.8 (NMD) and Ecoinvent v3.6 were applied.

The environmental modelling follows the methodology outlined in NEN-EN15804+A2 (version 1.2, January 2025) and the NMD Bepalingsmethode v1.2 (2025). All calculations were performed using Ecochain Helix software (v4.3.1), and background data was drawn from standardized and verified databases.

The full life cycle has been modelled, including Modules A1-A3 (production phase), A4-A5 (construction and transport), B1 (use phase), C1-C4 (end-of-life treatment), and D (reuse, recovery, recycling potential). No substances of very high concern (SVHC) were present in the product.

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 follow the modular structure of EN 15804+A2 & NMD Bepalingsmethode v1.2 (2025). Allocation was carried out according to EN15804, based on mass allocation for all energy and auxiliary inputs at the production site. No secondary or recycled materials were used in the primary production phase, although end-of-life benefits (Module D) from steel and zinc recycling were included.

Data Sources:
The data used for the Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 20-23mm, including its material composition, manufacturing energy, transport, and end-of-life assumptions, were collected from Walraven's internal systems for production, sourcing, energy, and logistics in the Czech Republic. Where supplier or process-specific data was unavailable, reference data for steel, zinc coating, and EPDM rubber from the NMD v3.8 and Ecoinvent 3.6 databases was used.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Modules A1 to A3 cover the life cycle stages beginning with raw material acquisition and upstream processes. Module A1 models the sourcing and processing of all raw and auxiliary materials used in manufacturing the Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 20-23mm. The product consists primarily of steel components (upper and lower clamp sections, screws), EPDM rubber lining, and a zinc coating. The inventory data for these materials is based on the 2023/2024 production year, using bills of materials and background data from the Nationale Milieudatabase (NMD) v3.8 and Ecoinvent v3.6. Where necessary, generic datasets were applied. The steel composition is modeled with 57% primary and 43% secondary content, reflecting the average market mix per Dutch LCA conventions.

Module A2 addresses the inbound transport of materials to the Walraven production site in the Czech Republic. While individual transport distances are not itemized, all transport was modeled according to EN 15804+A2 guidelines, using a 50% load factor assumption (fully loaded inbound, empty outbound). The transport emissions were calculated using NMD v3.8 and Ecoinvent v3.6 references for unspecified freight lorries (0001-tra&Transport, vrachtwagen).

Module A3 evaluates the manufacturing phase, incorporating electricity and auxiliary material use, packaging inputs, and waste generation. Production data for the year 2023/2024 was used from the Walraven Czech Republic facility. Inputs include electricity (grid mix and renewables), fuel, lubricating oil, and process emissions. Steel production waste (scrap) is accounted for, and a portion is sent for recycling based on the plant's production share. Capital goods are excluded under the cutoff rule in EN 15804+A2, as their contribution is below 5% of the total environmental profile.

Module A4 covers distribution of the finished clamp from the production site to the customer. A standard average distance of 150 km is used in line with the Bepalingsmethode v1.2. Transport emissions are modeled using a 50% truck load factor and unspecified lorry data from NMD and Ecoinvent databases.

Module A5 includes installation processes and associated material losses. A standard 5% material loss is applied due to manual on-site handling inefficiencies. No energy is required for installation. Waste from installation including steel, plastic, and rubber is modeled with transport to appropriate facilities: steel to landfill/recycling (100 km) and rubber/plastics to incineration (AVI, 100 km). These assumptions align with standard values in 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%

End-of-Life Management
Module C1 assumes manual uninstallation of the clamp at the end of its service life, with negligible energy consumption. Module C2 addresses the transport of waste materials, with steel and zinc conveyed 50 km to recycling facilities, and rubber and plastic transported 100 km to AVI incineration plants. Emissions are calculated based on material weight and transport distance, using standard truck datasets.

Waste Treatment
Module C3 covers waste processing, where steel and zinc are fully sorted and recycled, while rubber and plastic are incinerated with energy recovery at AVI facilities. Emission factors applied in this module are sourced from NMD v3.8: plastics are modeled using 0264-avC&Verbranden kunststoffen, steel with 0315-reC&Sorteren en persen oud ijzer, and rubber using 0260-avC&Verbranden rubber/EPDM.

Final Disposal
Module C4 accounts for residual waste, with 5% of steel and zinc directed to landfill, modeled with 0253-sto&Stort staal for steel and 0248-sto&Stort koper, lood, verzinkt staal, zink for zinc. Rubber and plastic are assumed to be fully incinerated, with no landfill allocation.

Benefits Beyond the System Boundary
Module D quantifies environmental credits from material recovery. Recycled steel is credited at a 52% substitution efficiency, calculated as 95% recycled minus 43% secondary content, while zinc benefits are modeled at 95% recycling efficiency. Plastics and rubber are assumed to provide 100% energy substitution through incineration.

All end-of-life modeling is compliant with EN 15804+A2:2019 + AC:2021 and aligns with the Dutch Bepalingsmethode v1.2 (2025), ensuring consistency with both national and European life cycle assessment standards.

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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