walraven

Environmental Product Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:

Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 48-51mm

Provided by:

J. van Walraven Holding B.V.

MRPI® registration:

1.1.00930.2025

Program operator:

Stichting MRPI®

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ECO PLATFORM EPD VERIFIED

MRPI milieu relevante product informatie

COMPANY INFORMATION

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MRPI® REGISTRATION

1.1.00930.2025

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 48-51mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

DESCRIPTION OF PRODUCT

The Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 48-51mm Clamp is a zinc-plated steel clamp with the Walraven BISMAT® quick locking system for efficient installation. It features a DIN 4109-compliant EPDM lining for noise reduction up to 23 dB(A) and is tested for fire safety, providing secure and durable pipe fastening.

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 48–51mm is a precision-engineered single-screw pipe clamp designed for fast, secure, and reliable pipe installation. It features the Walraven BISMAT® quick locking system, enabling one-handed operation for streamlined mounting while maintaining strong mechanical hold. Manufactured from robust steel with a corrosion-resistant zinc-plated finish, the clamp offers durability for long-term use in indoor and sheltered outdoor environments. The integrated EPDM lining provides superior noise insulation and vibration damping, meeting DIN 4109 standards and delivering noise reduction up to 23 dB(A) according to ISO 3822-1. Fire safety tested, the clamp is suitable for steel, copper, cast iron, and multilayer pipes with an outer diameter of 48–51 mm.

Manufacturing Location
The clamp is produced in the Borovince, Czech Republic under environmentally responsible manufacturing processes.

Manufacturing Process Overview
Steel coil processing ensures consistent structural strength through flattening and precision cutting. Stamping and bending form the clamp halves to achieve dimensional accuracy and a secure fit, while threading and resistance welding secure the M8 nut for reliable connections. Surface treatment includes zinc plating for corrosion protection, tested according to ISO 9227 standards. EPDM rubber lining is applied for acoustic insulation and vibration reduction in compliance with DIN 4109. Final assembly incorporates the pre-mounted locking screw and captive nut holder, reducing installation time and material waste.

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 zinc coating protects against corrosion, extending service life, while steel and EPDM components are fully recyclable and free from halogens and PVC. Internal recycling of scrap metal and polymer offcuts minimizes waste, and the clamp's long service life reduces replacement frequency.

Installation and Use Phase
The single-screw quick-lock system allows rapid mounting, saving labor time. EPDM lining effectively reduces structure-borne noise and vibration by up to 23 dB(A), and materials are free from volatile organic compounds, ensuring safe indoor use. 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 separated for recycling, with steel and EPDM fully recyclable through standard industrial waste streams. A full material breakdown and recycling guidance are available upon request.

Packaging and Transport
The product is supplied in recyclable cardboard packaging. Transport is optimized with a preference for consolidated freight and low-emission methods, including rail and sea transport.

Name - Half parts	
Steel - Lower part	
Steel - Upper part	
Steel - Hollow pan head screw	
Steel - BISMAT Hammer	
Rubber - EPDM	
Total Weight	**86 g**

Component (> 1%)	(%)
Steel (combined)	86,98%
Rubber - EPDM	10,43%

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.

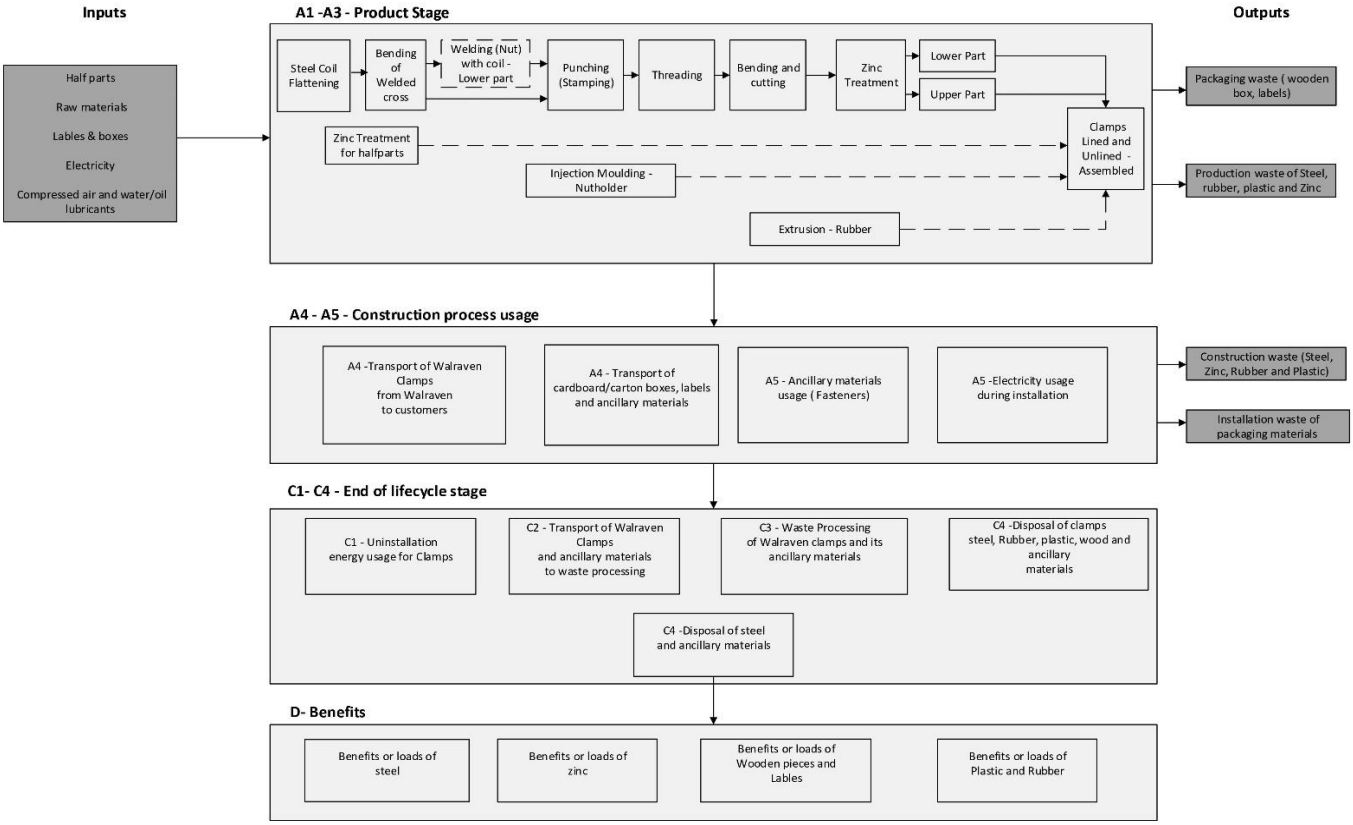
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental 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
Zinc Treatment for halfparts
Injection Moulding - Nutholder
Extrusion - Rubber
Clamps Lined and Unlined - Assembled
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 BISMAT® 2000 Clamp zinc plated EPDM M8 48-51mm. 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 BISMAT® Flash Clamp zinc plated EPDM 57-63mm UNC 3/8" IPS 2"
Walraven BISMAT® 5000 zinc plated EPDM green M8 40mm
Walraven 2S Clamp set zinc plated EPDM M8 31-37mm
Walraven BISMAT® Flash Clamp zinc plated EPDM 53-53mm UNC 3/8" CTS 2"
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 53-56mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8/10 53-56mm
Walraven BISMAT® 2000 Clamp zinc plated Silicon M8/10 57-63mm
Walraven BISMAT® 2000 Clamp zinc plated Silicon M8/10 48-52mm
Walraven BISMAT® Flash Clamp zp EPDM 48-51mm UNC 3/8" IPS 1 1/2"
Walraven 2S Clamp set zinc plated EPDM M8 25-30mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 59-63mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 48-51mm
Walraven BISMAT® 5000 zinc plated EPDM green M8 50mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8/10 59-63mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8/10 48-51mm
Walraven KSB1 Clamp zinc plated EPDM M8 58-63mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 53-56mm
Walraven 2S Clamp zinc plated EPDM M8/10 62-67mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8 53-56mm
Walraven 2S Clamp zinc plated EPDM M8 62-67mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 57-63mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 48-51mm
Walraven BISMAT® 2000 Clamp zinc plated Silicon M8/10 40-43mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8 59-63mm
Walraven 2S Clamp zinc plated EPDM M8/10 53-61mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8 48-51mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 40-43mm
Walraven KSB1 Clamp zinc plated EPDM M8 53-56mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8/10 40-43mm
Walraven 2S Clamp set zinc plated EPDM M8 20-24mm
Walraven BISMAT® Flash Clamp zp EPDM 40-43mm UNC 3/8" IPS 1 1/4" CTS 1
Walraven KSB1 Clamp zinc plated EPDM M8 48-51mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 40-43mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8 40-43mm
Walraven 2S Clamp zinc plated EPDM M8 53-61mm
Walraven 2S Clamp set zinc plated EPDM M8 15-19mm
Walraven Spiral Duct Clamp Stainless steel EPDM M8 225mm
Walraven 2S Clamp zinc plated EPDM M8 47-52mm
Walraven 2S Clamp zinc plated EPDM M8/10 47-52mm
Walraven 2S Clamp zinc plated EPDM M8/10 38-46mm
Walraven KSB1 Clamp zinc plated EPDM M8 40-43mm
Walraven 2S Clamp set zinc plated EPDM M8 10-14mm
Walraven BISMAT® 2000 Clamp zinc plated Silicon M8/10 31-35mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 31-35mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8/10 32-35mm
Walraven BISMAT® 2000 Clamp zinc plated Silicon M8/10 25-28mm
Walraven 2S Clamp zinc plated EPDM M8 38-46mm
Walraven BISMAT® 5000 zinc plated EPDM green M8 32mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8/10 25-28mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8/10 25-28mm
Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 31-35mm
Walraven BISMAT® Flash Clamp zinc plated EPDM M8 32-35mm

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.	2,11E-03	3,29E-07	3,56E-07	2,11E-03	4,41E-08	1,05E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,03E-07	2,43E-08	1,41E-10	-4,96E-06
ADPF	MJ	3,74E+00	1,97E-01	4,20E-01	4,35E+00	2,64E-02	1,79E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,16E-02	8,44E-03	4,29E-04	-8,70E-01
GWP	kg CO2 eq.	2,37E-01	1,29E-02	3,21E-02	2,82E-01	1,73E-03	1,29E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,03E-03	2,25E-02	1,51E-05	-5,17E-02
ODP	kg CFC11 eq.	1,97E-08	2,28E-09	1,77E-09	2,38E-08	3,06E-10	1,04E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,15E-10	9,05E-11	5,04E-12	-4,00E-09
POCP	kg ethene eq.	2,18E-04	7,76E-06	-1,39E-05	2,11E-04	1,04E-06	5,63E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,43E-06	4,37E-07	1,61E-08	-1,03E-04
AP	kg SO2 eq.	1,33E-03	5,66E-05	1,12E-04	1,50E-03	7,59E-06	6,68E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,77E-05	6,06E-06	1,11E-07	-1,92E-04
EP	kg (PO4) 3 eq.	1,90E-04	1,11E-05	2,45E-05	2,25E-04	1,49E-06	1,04E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,48E-06	1,22E-06	2,14E-08	-2,28E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	4,27E-01	5,42E-03	-2,86E-03	4,30E-01	7,27E-04	2,01E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,70E-03	5,44E-04	6,84E-06	-3,05E-02
FAETP	kg DCB eq.	7,32E-03	1,58E-04	1,61E-04	7,64E-03	2,12E-05	3,96E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,95E-05	1,28E-05	1,62E-07	1,99E-04
MAETP	kg DCB eq.	1,37E+01	5,69E-01	8,41E-01	1,51E+01	7,63E-02	7,66E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,78E-01	4,68E-02	5,80E-04	-1,30E-01
TETP	kg DCB eq.	2,70E-03	1,91E-05	1,57E-04	2,88E-03	2,57E-06	2,49E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,99E-06	2,72E-06	1,72E-08	2,10E-03
ECI	euro	6,01E-02	1,55E-03	2,12E-03	6,38E-02	2,08E-04	2,96E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,85E-04	1,22E-03	2,14E-06	-6,46E-03
ADPF	kg Sb eq.	1,80E-03	9,46E-05	2,02E-04	2,09E-03	1,27E-05	8,61E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,96E-05	4,06E-06	2,06E-07	-4,18E-04

ADPE = Abiotic Depletion Potential for non-fossil resources
ADPF = Abiotic Depletion Potential for fossil resources
GWP = Global Warming Potential
ODP = Depletion potential of the stratospheric ozone layer
POCP = Formation potential of tropospheric ozone photochemical oxidants
AP = Acidification Potential of land and water
EP = Eutrophication Potential
HTP = Human Toxicity Potential
FAETP = Fresh water aquatic ecotoxicity potential
MAETP = Marine aquatic ecotoxicity potential
TETP = Terrestrial ecotoxicity potential
ECI = Environmental Cost Indicator
ADPF = Abiotic Depletion Potential for fossil resources

ENVIRONMENTAL IMPACT per functional unit or declared unit (core indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	2,44E-01	1,30E-02	3,17E-02	2,88E-01	1,74E-03	1,31E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,07E-03	2,37E-02	1,54E-05	-5,48E-02
GWP-fossil	kg CO2 eq.	2,42E-01	1,30E-02	3,16E-02	2,87E-01	1,74E-03	1,30E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,06E-03	2,25E-02	1,54E-05	-5,49E-02
GWP-biogenic	kg CO2 eq.	1,02E-03	4,84E-06	5,94E-05	1,09E-03	6,49E-07	5,57E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,52E-06	1,14E-03	9,02E-09	0,00E+00
GWP-luluc	kg CO2 eq.	5,26E-04	4,75E-06	3,76E-05	5,68E-04	6,38E-07	2,97E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,49E-06	5,22E-07	4,30E-09	2,31E-05
ODP	kg CFC11 eq.	2,07E-08	2,86E-09	1,31E-09	2,49E-08	3,84E-10	1,11E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,97E-10	1,02E-10	6,35E-12	-4,15E-09
AP	mol H+ eq.	1,63E-03	7,53E-05	1,34E-04	1,84E-03	1,01E-05	8,25E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,36E-05	7,82E-06	1,46E-07	-2,33E-04
EP-fresh water	kg P eq.	1,86E-05	1,31E-07	5,88E-06	2,46E-05	1,76E-08	1,14E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,10E-08	3,04E-08	1,73E-10	-1,99E-06
EP-marine	kg N eq.	3,38E-04	2,65E-05	1,80E-05	3,82E-04	3,56E-06	1,78E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,30E-06	2,23E-06	5,03E-08	-4,03E-05
EP-terrestrial	mol N eq.	3,74E-03	2,92E-04	2,18E-04	4,25E-03	3,92E-05	1,97E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,15E-05	2,53E-05	5,55E-07	-4,71E-04
POCP	kg NMVOC eq.	1,22E-03	8,35E-05	1,99E-05	1,32E-03	1,12E-05	5,34E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,61E-05	6,52E-06	1,61E-07	-3,00E-04
ADP-minerals & metals	kg Sb eq.	2,11E-03	3,29E-07	3,56E-07	2,11E-03	4,41E-08	1,05E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,03E-07	2,43E-08	1,41E-10	-4,96E-06
ADP-fossil	MJ, net calorific value	3,46E+00	1,96E-01	4,73E-01	4,12E+00	2,63E-02	1,78E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,13E-02	8,32E-03	4,31E-04	-6,65E-01
WDP	m3 world eq. Deprived	1,52E-01	7,00E-04	8,03E-03	1,60E-01	9,39E-05	7,23E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,19E-04	3,12E-04	1,93E-05	-1,64E-02

GWP-total	=	Global Warming Potential total
GWP-fossil	=	Global Warming Potential fossil fuels
GWP-biogenic	=	Global Warming Potential biogenictotal
GWP-luluc	=	Global Warming Potential land use and land use change
ODP	=	Depletion potential of the stratospheric ozone layer
AP	=	Acidification Potential, Accumulated Exceedence
EP-freshwater	=	Eutrophication Potential, fraction of nutrients reaching freshwater end compartment
EP-marine	=	Eutrophication Potential, fraction of nutrients reaching marine end compartment
EP-terrestrial	=	Eutrophication Potential, Accumulated Exceedence
POCP	=	Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals & metals	=	Abiotic Depletion Potential for non-fossil resources [1]
ADP-fossil	=	Abiotic Depletion for fossil resources potential [1]
WDP	=	Water (user) deprivation potential, deprivation-weighted water consumption [1]

Disclaimer [1]:

- The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ENVIRONMENTAL IMPACT per functional unit or declared unit (additional indicators A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease inci-dence	1,59E-08	1,17E-09	-7,53E-10	1,63E-08	1,56E-10	6,80E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,65E-10	7,32E-11	2,84E-12	-3,28E-09
IRP	kBq U235 eq.	1,59E-02	8,20E-04	2,94E-03	1,97E-02	1,10E-04	9,77E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,57E-04	3,44E-05	1,77E-06	-5,32E-04
ETP-fw	CTUe	2,45E+01	1,75E-01	-5,32E-02	2,46E+01	2,34E-02	1,15E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,46E-02	5,88E-02	2,80E-04	-1,69E+00
HTP-c	CTUh	1,47E-09	5,66E-12	-6,05E-11	1,42E-09	7,60E-13	7,05E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,77E-12	7,78E-13	6,46E-15	-1,20E-11
HTP-nc	CTUh	2,54E-08	1,91E-10	-6,13E-11	2,56E-08	2,56E-11	1,70E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,97E-11	4,12E-11	1,99E-13	8,26E-09
SQP	-	1,25E+00	1,70E-01	1,16E-01	1,54E+00	2,28E-02	7,43E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,31E-02	1,17E-02	9,04E-04	-1,41E-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	2,74E-04	4,96E-07	-9,19E-07	2,74E-04	6,65E-08	1,34E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,55E-07	3,40E-08	6,44E-10	-5,41E-06
NHWD	kg	6,36E-02	1,24E-02	2,69E-03	7,87E-02	1,67E-03	4,14E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,89E-03	6,72E-04	2,93E-03	-5,15E-03
RWD	kg	1,36E-05	1,29E-06	2,44E-06	1,74E-05	1,72E-07	8,29E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,02E-07	4,11E-08	2,83E-09	-1,38E-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	5,56E-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	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
ETE	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

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	3,48E-01	2,45E-03	5,09E-02	4,01E-01	3,29E-04	1,98E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,67E-04	9,73E-04	3,49E-06	-7,82E-03
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	3,48E-01	2,45E-03	5,09E-02	4,01E-01	3,29E-04	1,98E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,67E-04	9,73E-04	3,49E-06	-7,82E-03
PENRE	MJ	3,67E+00	2,08E-01	5,10E-01	4,39E+00	2,79E-02	1,90E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,50E-02	8,89E-03	4,58E-04	-7,00E-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	3,87E+00	2,08E-01	5,10E-01	4,58E+00	2,79E-02	1,90E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,50E-02	8,89E-03	4,58E-04	-7,00E-01
SM	kg	2,52E-02	0,00E+00	4,41E-06	2,52E-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	4,57E-03	2,38E-05	9,76E-04	5,57E-03	3,20E-06	2,61E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,46E-06	3,10E-05	4,60E-07	-3,80E-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 Walraven BISMAT® 2000 Clamp zinc plated EPDM M8 48-51mm, 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 48-51mm. 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 – Modules C1 to C4
Module C1 assumes manual uninstallation of the clamp at end-of-life, with negligible energy use. Module C2 models transport of deconstructed materials, with steel and zinc transported 50 km to recycling facilities, and rubber and plastic transported 100 km to incineration (AVI) plants. Transport emissions are calculated based on material weight and distance using standard truck datasets. Module C3 covers waste treatment: steel and zinc are fully sorted and recycled, while rubber and plastic are entirely incinerated with energy recovery at AVI plants. Emission factors are sourced from NMD v3.8, using 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 models final disposal, assuming 5% of steel and zinc are sent to landfill (0253-sto&Stort staal for steel, 0248-sto&Stort koper, lood, verzinkt staal, zink for zinc), while rubber and plastics are fully incinerated with no landfill contribution.

Benefits Beyond the System Boundary – Module D
Module D quantifies environmental credits beyond the product system boundary. Steel recycling is credited with a 52% substitution benefit, calculated as 95% recycled minus 43% secondary content. Zinc recycling benefits are modeled at 95% efficiency, and energy recovery from rubber and plastic incineration is credited at 100%, displacing fossil energy.

The modeling approach complies fully with EN 15804+A2:2019/AC:2021 and follows the Bepalingsmethode v1.2 (2025), ensuring that all life cycle phases are assessed consistently with current Dutch and European LCA 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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