walraven

Environmental
Product
Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:
Walraven 2S Clamp zinc plated M8/10 68-74mm

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

MRPI® registration:
1.1.00946.2025

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Stichting MRPI®
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ECO PLATFORM EPD VERIFIED

MRPI milieu relevante product informatie

COMPANY INFORMATION

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PRODUCT

Walraven 2S Clamp zinc plated M8/10 68-74mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

DESCRIPTION OF PRODUCT

Steel clamp from the gapless range, zinc plated and equipped with anti-loss washers for easy installation. Ideal for supporting insulated pipes.

MRPI® REGISTRATION

1.1.00946.2025

DATE OF THIS ISSUE

15-5-2025

EXPIRY DATE

15-5-2030

VISUAL PRODUCT

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

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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 2S Clamp zinc plated M8/10 (68–74 mm) is a sturdy, two-screw steel pipe clamp designed to provide reliable mechanical support for pipes in indoor installations. The clamp features zinc plating for corrosion resistance and is equipped with anti-loss washers, ensuring secure fastening during assembly. This product is suitable for applications that do not require specific noise or vibration dampening.

Manufacturing Location
The clamp is manufactured in the Borovince, Czech Republic at Walraven facilities operating under certified environmental management practices, ensuring both quality and sustainability.

Manufacturing Process Overview
The clamp body is made from cold-formed DC11 steel, with fasteners consisting of hollow pan-headed screws conforming to EN ISO 898-1 Class 4.8. Anti-loss washers are produced from POM (polyoxymethylene). The zinc-plated surface provides corrosion protection, validated via ISO 9227 salt spray testing. Production encompasses all lifecycle stages, from raw material extraction through end-of-life management, covering Modules A1-A5, B1, C1-C4, and D. The product contains no SVHCs (Substances of Very High Concern).

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 clamp's zinc coating and steel composition offer validated indoor corrosion resistance. Material efficiency is high, with over 50% recycled steel used, and zinc finishing losses are minimal (~5%). The product is VOC-free, ensuring safe indoor air quality throughout its lifecycle. Life cycle assessment was conducted using Ecochain Helix v4.3.1 with Ecoinvent v3.6 data, in compliance with EN15804+A2. Climate impact for the production stage (A1–A3) is assessed using cradle-to-gate methodology. End-of-life benefits include credits for the recycling of steel and zinc, significantly reducing net environmental impact.

Installation and Use Phase
The dual-screw design is delivered pre-assembled, enabling quick and straightforward installation. The clamp is suitable for HVAC, utility, and mechanical piping systems in non-acoustic applications. It generates no emissions during use and supports indoor air quality. Designed for durability, the product offers an expected service life of up to 50 years under protected indoor or semi-sheltered conditions. The necessary internal transport of Czech Republic to Netherlands has been accounted in the production process of A1-A3.

End-of-Life Considerations
At the end of its service life, the clamp can be manually dismantled for recycling. Approximately 95% of metal components (steel and zinc) are recycled, while plastics are either incinerated or landfilled. Module D credits for recycled materials are applied, reflecting the environmental benefit of material recovery.

Packaging and Transport
Transportation is modeled via EURO 5/6 freight truck with a 50% load factor. Packaging is designed to minimize environmental impact.

Compliance and Certifications
The product and its environmental assessment comply with EN15804+A2, ISO 14025, ISO 14040/44, and ISO 9227 (salt spray test). Reference service life is established at up to 50 years under protected indoor or semi-sheltered conditions.

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

Total Weight	102 g

Component (> 1%)	(%)
Steel (combined)	96,68%

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.

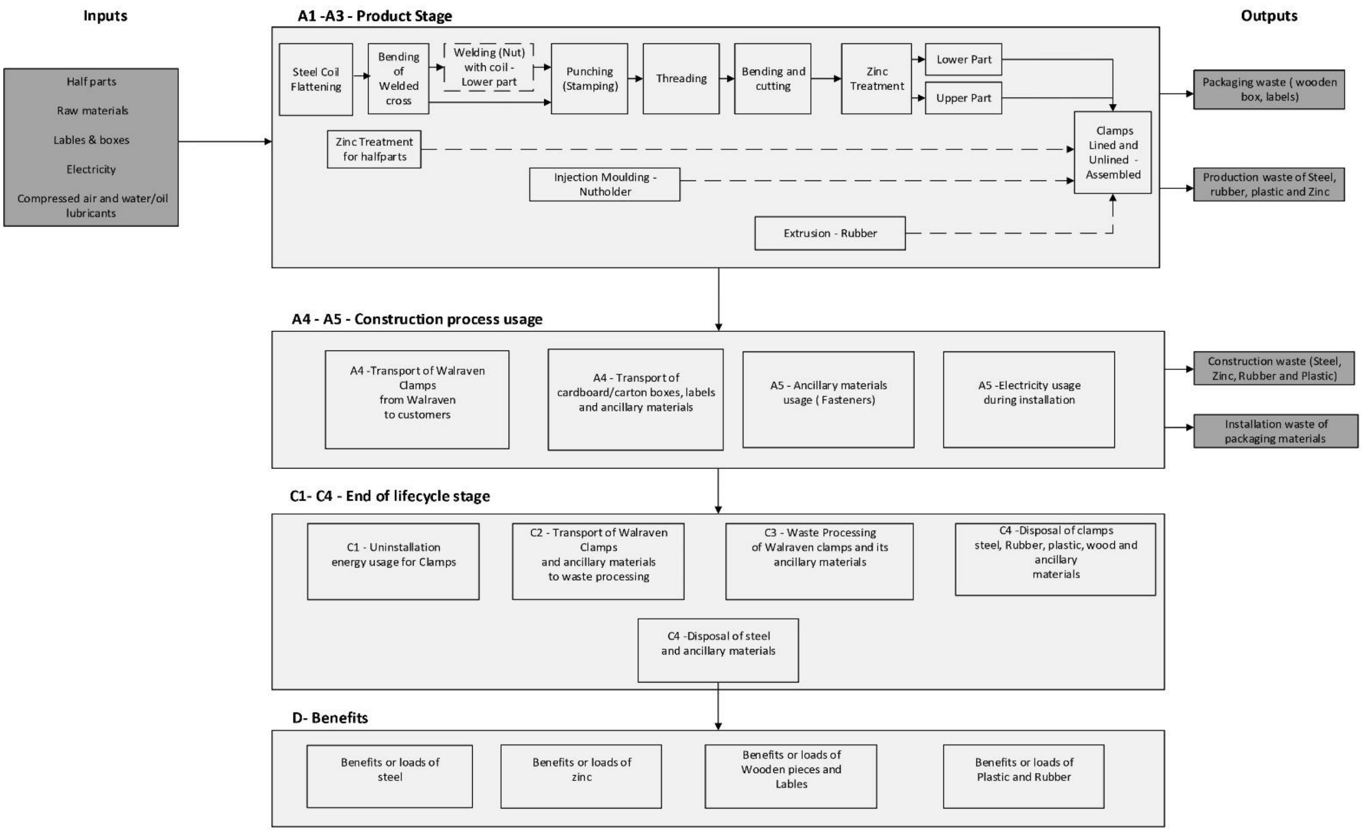
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental 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 2S Clamp zinc plated M8/10 68-74mm. The remaining products which are aggregated in the same group by following the 20% allocation and worst case scenario as per the EN 15804+A2 & NMD Bepalingsmethode v1.2 (2025) are listed below:

Walraven 2S Clamp zinc plated M8/10 82-87mm
Walraven 2S Clamp zinc plated M8/10 75-81mm
Walraven 2S Clamp zinc plated M8/10 68-74mm
Walraven 2S Clamp set zinc plated M8 62-67mm
Walraven 2S Clamp set zinc plated M8 53-61mm
Walraven 2S Clamp set zinc plated M8 38-46mm
Walraven Bifix® 300 Clamp Stainless M10 129-134mm
Walraven 2S Clamp set zinc plated M8 47-52mm
Walraven 2S Clamp set zinc plated M8 38-46mm
Walraven 4000 Clamp M8 zinc plated 200mm
Walraven 2S Clamp zinc plated M8/10 62-67mm
Walraven 2S Clamp zinc plated M8 62-67mm
Walraven 2S Clamp set zinc plated M8 31-37mm
Walraven 2S Clamp zinc plated M8 53-61mm
Walraven 2S Clamp zinc plated M8/10 53-61mm
Walraven Strut Clamp 603 pre-galvanized M8 85-90mm
Walraven 2S Clamp set zinc plated M8 25-30mm
Walraven Strut Clamp 603 pre-galvanized M8 45-50mm
Walraven 2S Clamp zinc plated M8/10 47-52mm
Walraven Strut Clamp 603 pre-galvanized M6 26-30mm
Walraven Strut Clamp 603 pre-galvanized M6 20-22mm
Walraven Lining for 3000 Clamp 25x2mm

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.	3,33E-03	3,59E-07	3,56E-07	3,33E-03	5,23E-08	1,66E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,72E-08	1,82E-08	1,99E-10	-4,21E-08
ADPF	MJ	4,67E+00	2,15E-01	4,20E-01	5,31E+00	3,13E-02	2,33E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,22E-02	4,50E-03	6,05E-04	-7,36E-01
GWP	kg CO2 eq.	3,19E-01	1,40E-02	3,21E-02	3,65E-01	2,05E-03	1,57E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,41E-03	4,79E-04	2,14E-05	-5,72E-02
ODP	kg CFC11 eq.	2,31E-08	2,49E-09	1,77E-09	2,74E-08	3,63E-10	1,32E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,05E-10	4,49E-11	7,12E-12	-1,99E-09
POCP	kg ethene eq.	2,82E-04	8,48E-06	-1,39E-05	2,77E-04	1,24E-06	7,81E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,06E-06	2,87E-07	2,28E-08	-1,24E-04
AP	kg SO2 eq.	1,85E-03	6,20E-05	1,12E-04	2,02E-03	9,00E-06	9,28E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,50E-05	3,20E-06	1,56E-07	-1,94E-04
EP	kg (PO4) 3 eq.	2,67E-04	1,21E-05	2,45E-05	3,04E-04	1,77E-06	1,43E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,95E-06	4,10E-07	3,02E-08	-2,30E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	6,02E-01	5,91E-03	-2,86E-03	6,05E-01	8,62E-04	2,86E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,44E-03	3,98E-04	9,66E-06	-3,57E-02
FAETP	kg DCB eq.	1,08E-02	1,73E-04	1,61E-04	1,11E-02	2,52E-05	5,81E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,19E-05	7,81E-06	2,29E-07	4,43E-04
MAETP	kg DCB eq.	1,98E+01	6,21E-01	8,41E-01	2,13E+01	9,05E-02	1,10E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,51E-01	3,31E-02	8,20E-04	3,70E-01
TETP	kg DCB eq.	3,75E-03	2,09E-05	1,57E-04	3,93E-03	3,05E-06	3,46E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,08E-06	1,23E-06	2,43E-08	2,99E-03
ECI	euro	8,40E-02	1,69E-03	2,12E-03	8,78E-02	2,47E-04	4,07E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,11E-04	8,08E-05	3,02E-06	-7,13E-03
ADPF	kg Sb eq.	2,25E-03	1,03E-04	2,02E-04	2,55E-03	1,51E-05	1,12E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,51E-05	2,16E-06	2,91E-07	-3,54E-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.	3,28E-01	1,42E-02	3,17E-02	3,74E-01	2,07E-03	1,59E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,44E-03	-1,15E-03	2,18E-05	-6,13E-02
GWP-fossil	kg CO2 eq.	3,26E-01	1,42E-02	3,16E-02	3,72E-01	2,06E-03	1,58E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,44E-03	4,83E-04	2,18E-05	-6,14E-02
GWP-biogenic	kg CO2 eq.	1,48E-03	5,28E-06	5,94E-05	1,55E-03	7,70E-07	8,17E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,28E-06	-1,63E-03	1,27E-08	0,00E+00
GWP-luluc	kg CO2 eq.	7,24E-04	5,19E-06	3,76E-05	7,67E-04	7,57E-07	4,07E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,26E-06	3,75E-07	6,07E-09	4,52E-05
ODP	kg CFC11 eq.	2,34E-08	3,12E-09	1,31E-09	2,79E-08	4,56E-10	1,38E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,60E-10	5,13E-11	8,97E-12	-1,50E-09
AP	mol H+ eq.	2,28E-03	8,24E-05	1,34E-04	2,50E-03	1,20E-05	1,15E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,00E-05	3,99E-06	2,07E-07	-2,37E-04
EP-fresh water	kg PO4 eq.	2,66E-05	1,43E-07	5,88E-06	3,26E-05	2,08E-08	1,52E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,47E-08	2,25E-08	2,44E-10	-2,16E-06
EP-marine	kg N eq.	4,82E-04	2,90E-05	1,80E-05	5,29E-04	4,22E-06	2,49E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,03E-06	8,84E-07	7,11E-08	-4,39E-05
EP-terrestrial	mol N eq.	5,34E-03	3,20E-04	2,18E-04	5,88E-03	4,65E-05	2,75E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,75E-05	1,03E-05	7,84E-07	-5,12E-04
POCP	kg NMVOC eq.	1,69E-03	9,13E-05	1,99E-05	1,80E-03	1,33E-05	7,45E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,21E-05	2,80E-06	2,28E-07	-3,48E-04
ADP-minerals & metals	kg Sb eq.	3,33E-03	3,59E-07	3,56E-07	3,33E-03	5,23E-08	1,66E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,72E-08	1,82E-08	1,99E-10	-4,21E-08
ADP-fossil	MJ, net calorific value	4,27E+00	2,13E-01	4,73E-01	4,95E+00	3,11E-02	2,31E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,19E-02	4,60E-03	6,09E-04	-4,31E-01
WDP	m3 world eq. Deprived	2,12E-01	7,63E-04	8,03E-03	2,20E-01	1,11E-04	1,05E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,86E-04	5,31E-05	2,73E-05	-1,17E-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	2,12E-08	1,27E-09	-7,53E-10	2,17E-08	1,85E-10	9,34E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,09E-10	4,98E-11	4,01E-12	-3,54E-09
IRP	kBq U235 eq.	2,11E-02	8,95E-04	2,94E-03	2,50E-02	1,30E-04	1,32E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,17E-04	2,28E-05	2,50E-06	1,05E-03
ETP-fw	CTUe	3,72E+01	1,90E-01	-5,32E-02	3,73E+01	2,78E-02	1,77E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,63E-02	2,13E-02	3,95E-04	-2,05E+00
HTP-c	CTUh	2,15E-09	6,18E-12	-6,05E-11	2,10E-09	9,01E-13	1,05E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,50E-12	5,00E-13	9,13E-15	-7,86E-12
HTP-nc	CTUh	3,79E-08	2,08E-10	-6,13E-11	3,81E-08	3,04E-11	2,50E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,06E-11	2,30E-11	2,81E-13	1,19E-08
SQP	-	1,70E+00	1,85E-01	1,16E-01	2,00E+00	2,70E-02	9,96E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,50E-02	9,06E-03	1,28E-03	-9,47E-02

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	4,33E-04	5,41E-07	-9,19E-07	4,32E-04	7,89E-08	2,13E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,32E-07	1,38E-08	9,10E-10	-7,35E-06
NHWD	kg	8,96E-02	1,35E-02	2,69E-03	1,06E-01	1,98E-03	5,47E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,29E-03	1,33E-04	4,13E-03	-6,00E-03
RWD	kg	1,67E-05	1,40E-06	2,44E-06	2,05E-05	2,04E-07	1,07E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,41E-07	2,70E-08	4,00E-09	3,61E-07
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	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	7,86E-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	6,00E-05	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	4,50E-04
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	2,61E-04

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	4,80E-01	2,67E-03	5,09E-02	5,34E-01	3,90E-04	2,74E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,50E-04	7,16E-04	4,92E-06	1,24E-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	4,80E-01	2,67E-03	5,09E-02	5,34E-01	3,90E-04	2,74E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,50E-04	7,16E-04	4,92E-06	1,24E-02
PENRE	MJ	4,54E+00	2,27E-01	5,10E-01	5,27E+00	3,31E-02	2,46E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,51E-02	4,87E-03	6,47E-04	-4,47E-01
PENRM	MJ	1,45E-03	0,00E+00	0,00E+00	1,45E-03	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	4,54E+00	2,27E-01	5,10E-01	5,28E+00	3,31E-02	2,46E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,51E-02	4,87E-03	6,47E-04	-4,47E-01
SM	kg	3,56E-02	0,00E+00	4,41E-06	3,56E-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	6,42E-03	2,60E-05	9,76E-04	7,42E-03	3,79E-06	3,61E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,32E-06	2,36E-06	6,50E-07	-2,22E-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 for this LCA have been modelled to reflect real production conditions as closely as possible. Primary data was collected directly from Walraven's production facility in the Czech Republic and used wherever available. In cases where supplier-specific data was incomplete or unavailable, geographically relevant background data was sourced from verified databases, primarily Ecoinvent 3.6 accessed via the Dutch Nationale Milieudatabase v3.8.

For Module A1, product composition was based on detailed manufacturer specifications. Module A2 incorporates actual transport distances for raw materials to the production site. Module A3 captures energy use, waste generation, and emissions from production activities conducted during 2023/2024. Background processes were aligned with EN15804+A2:2019 standards.

Data Collection Period
The dataset is representative of production operations during the 2023/2024 period.

Methodology and Reproducibility
The LCA was conducted in compliance with EN 15804+A2:2019, ISO 14040, ISO 14044, ISO 14025, and the NMD Bepalingsmethode v1.2 (2025). All calculations and modelling were performed using Ecochain Helix software (version 4.3.1). The assessment covers the following life cycle modules: A1–A3 (raw material supply, transport, manufacturing), A4–A5 (transport to site, installation), C1–C4 (demolition, waste transport, processing, disposal), and D (reuse, recovery, and recycling potential).

Inventory and Allocation
All relevant material, energy, emissions, and waste flows were included in the LCA. Allocation of site-level inputs, such as electricity and auxiliary materials, was conducted using mass-based allocation principles. No secondary materials were used during production, and cut-off criteria were applied according to EN15804+A2, ensuring that excluded inputs do not exceed 5% of total mass or energy per module.

Data Sources
Primary data from Walraven's Czech facility includes raw material sourcing, energy consumption, waste generation, and transport distances. Where specific environmental data from suppliers was unavailable, representative datasets from Ecoinvent 3.6 (via NMD v3.8) were applied. Materials considered include steel, zinc coating, and POM components, alongside transport logistics (truck and ship) and electricity from the Czech grid. Environmental impact characterization followed the EF 3.0 and CML methodologies, ensuring comprehensive and reproducible LCA results.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Modules A1–A3 encompass the cradle-to-gate phases. Module A1 covers raw material extraction and processing, including steel (lower/upper clamp, screws), zinc coating, and a plastic (POM) anti-loss washer. The product composition is based on 2023/2024 production data from Walraven Czech Republic. Material inputs are modeled with NMD v3.8 and Ecoinvent v3.6 references. Steel was modeled using a 57% primary and 43% secondary composition, consistent with NMD market averages.

Module A2 addresses the inbound transportation of raw materials to the manufacturing facility. Transport is modeled using unspecified freight trucks with a 50% load factor (full load in, empty return), following EN 15804+A2 guidelines. Distances vary by material: steel parts and screws range from 300 to 1140 km, while plastic POM includes ocean freight. Zinc processing includes an additional 100 km of trucking.

Module A3 models the clamp production at the Walraven Czech Republic plant. Primary data from 2023 includes electricity (mixed grid and renewables), lubricating oil, and site energy allocation. Production waste such as steel scrap is tracked, with recycling modeled accordingly. Site-level energy and auxiliary inputs are distributed via mass allocation across production outputs. Capital goods are excluded following the EN 15804 cutoff rule (impact <5%).

Module A4 models the distribution of the clamp to the customer. A default transport distance of 150 km is assumed with a 50% load factor using NMD/Ecoinvent truck references. Emissions are calculated in ton-kilometers.

Module A5 accounts for installation, assuming manual assembly and a 5% material loss rate for all components. No additional energy is consumed. Steel waste is transported 100 km to landfill/recycling; plastic (POM) is incinerated at AVI facilities after 100 km of transport. These transport emissions and disposal routes align with Bepalingsmethode v1.2 (2025) fixed values.

End-of-Life Scenario Fixed Values used:

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

Module C1 considers manual dismantling of the clamp, assuming negligible energy consumption. No mechanical or electrical energy inputs are modeled during this phase.

Module C2 models the transport of waste to processing facilities. Steel and zinc components are transported 50 km to recycling or landfill sites, while plastic components (POM) are transported 100 km to AVI incineration plants. Emissions and energy use from transport are based on standard truck datasets from NMD v3.8 and Ecoinvent v3.6.

Module C3 addresses waste treatment processes. Steel and zinc are assumed to be 100% sorted and recycled, following NMD reference 0315-reC&Sorteren en persen oud ijzer. Plastic components are fully incinerated at AVI facilities, with energy recovery modeled according to NMD reference 0264-avC&Verbranden kunststoffen. Energy and emission flows are tracked to reflect realistic end-of-life treatment.

Module C4 models final disposal. Approximately 5% of steel and zinc are sent to landfill using NMD references 0253-sto&Stort staal and 0248-sto&Stort koper, lood, verzinkt staal, zink, while plastic components are fully incinerated with energy recovery.

Module D evaluates environmental benefits beyond the system boundary. Recycled steel provides a 52% substitution benefit, calculated as the difference between 95% recycling and 43% secondary material content. Zinc is modeled with a 95% recycling efficiency. Plastic incineration is credited with 100% energy substitution, representing avoided virgin material production and fossil energy use.

This Environmental Product Declaration follows EN 15804+A2:2019 + AC:2021 and the Dutch Bepalingsmethode v1.2 (2025). The modular LCA approach reflects current best practices for production, transport, end-of-life treatment, and resource recovery, using validated and representative datasets.

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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