Environmental Product Declaration

According to EN15804+A2 (+indicators A1)

This declaration is for:

Walraven Bifix® 1301 Clamp Stainless EPDM M10 40-43mm

Provided by:

J. van Walraven Holding B.V.

MRPI® registration:

1.1.00926.2025

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Stichting MRPI®

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MRPI® REGISTRATION

1.1.00926.2025

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 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 Bifix® 1301 Clamp Stainless EPDM M10 40-43mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

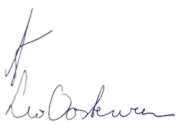
DESCRIPTION OF PRODUCT

The Walraven 1301 Stainless M10 EPDM Clamp is a robust two-screw pipe clamp with a quick locking system for efficient installation. Made from high-grade stainless steel 1.4404 (AISI 316L), it features a black EPDM noise-insulating, age-resistant lining that meets DIN 4109 standards. Designed for long-lasting corrosion resistance and reliable vibration damping in demanding environments.

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 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 Bifix® 1301 Clamp Stainless EPDM M10 40-43mm is a high-quality, corrosion-resistant two-screw pipe clamp designed for secure fastening of pipes in demanding environments. It is constructed from stainless steel 1.4404 (AISI 316L), making it suitable for applications that require long-term durability and exceptional resistance to corrosion. The clamp is fitted with a black EPDM noise-insulating and age-resistant lining that provides vibration damping and noise reduction in accordance with DIN 4109 acoustic standards. An integrated quick locking system ensures efficient installation, supporting both new installations and maintenance work.

Manufacturing Location
The clamp is manufactured in the Horka, Czech Republic using precision engineering processes under strict quality control standards.

Manufacturing Process Overview
Stainless steel 1.4404 (AISI 316L) is first cut and formed to provide high strength and corrosion resistance. The clamp halves are then shaped with precision stamping and forming tools to ensure dimensional accuracy. Integrated nuts and bolts are pre-installed to facilitate easy assembly. The black EPDM rubber lining is applied to meet DIN 4109 requirements for sound insulation and vibration damping. Finally, the two-screw design with the quick locking mechanism is completed and the clamp is prepared for installation.

Electricity usage references:
Reference: 0569-pro & Elektriciteit, Nederlandse mix, bij consument, per kWh (73% grijs, 27% hernieuwbaar), Database: Ecoinvent v3.6 (Cut-off, NMD), GWP : 0.389 kg CO_2eq/kWh

Reference: market for electricity, low voltage | electricity, low voltage | Czech Republic, Database: Ecoinvent v3.6 (Cut-off, NMD), GWP : 0.936 kg CO2-eq/kWh

Environmental and Performance Features
The stainless steel construction ensures exceptional corrosion resistance in aggressive environments, including marine and chemical exposure. The EPDM lining reduces structure-borne sound and absorbs vibrations, maintaining its performance over time. The lining is also reliable across a wide range of operating temperatures.

Installation and Use Phase
The two-screw clamp with a quick locking system allows for fast and secure installation. It is compatible with a wide range of pipe materials, including those in corrosion-sensitive or hygienic environments, and the stainless steel construction minimizes maintenance requirements.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 life, the stainless steel and EPDM components can be easily separated for recycling. The bolted design supports simple disassembly for efficient material recovery.

Packaging and Transport
The clamp is delivered in recyclable packaging materials, and transport is optimized to reduce the environmental footprint.

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

Total Weight	77 g

Component (> 1%)	(%)
Steel (combined)	90,37%
Rubber - EPDM	6,96%

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.

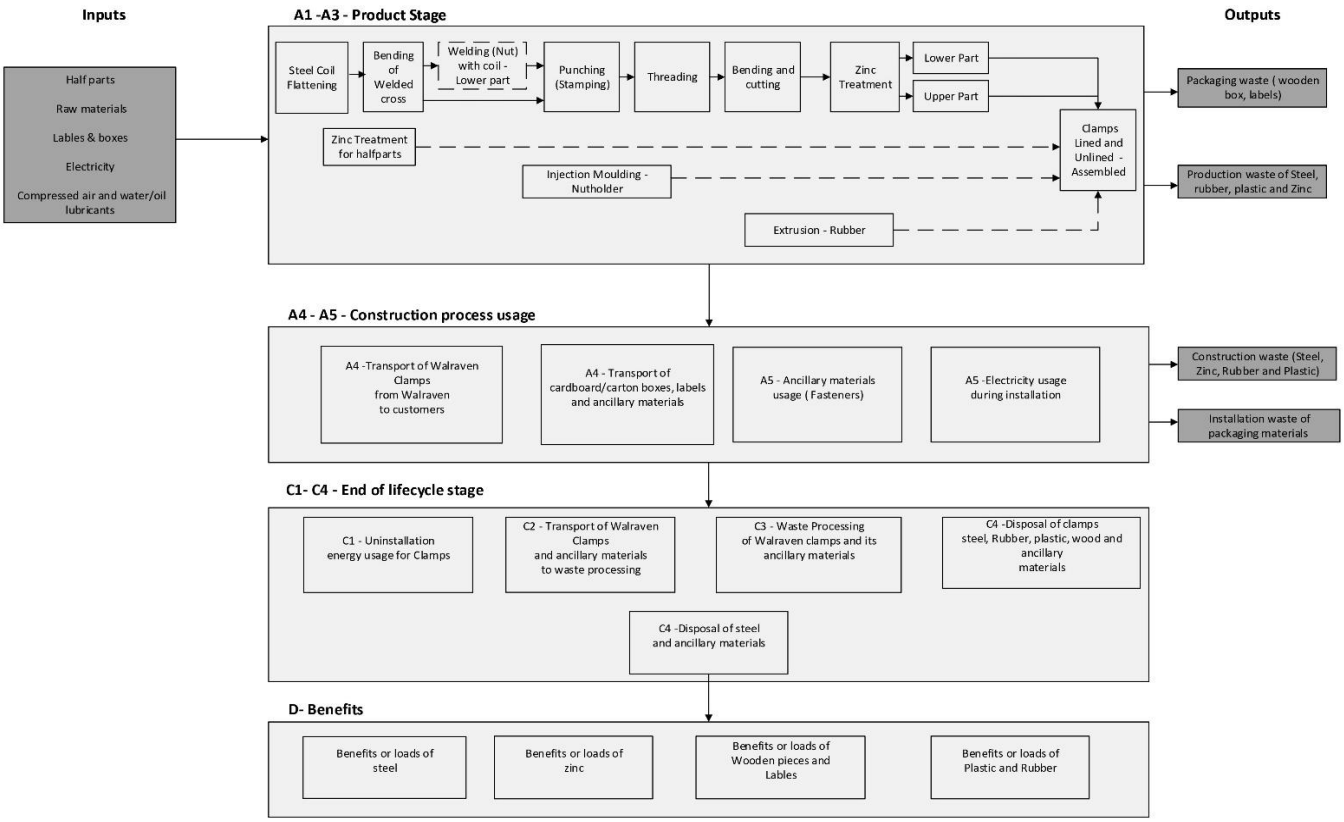
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental 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 Bifix® 1301 Clamp Stainless EPDM M10 40-43mm. The remaining products which are aggregated in the same group by following the 20% allocation and worst-case scenario approach as per EN 15804+A2 and NMD Bepalingsmethode v1.2 (2025) are listed below:

Walraven Bifix® 1301 Clamp Stainless EPDM M10 57-64mm
Walraven Bifix® 1301 Clamp Stainless EPDM M10 52-56mm
Walraven Bifix® 1301 Clamp Stainless EPDM M8 57-64mm
Walraven Bifix® 1301 Clamp Stainless EPDM M10 47-51mm
Walraven Bifix® 1301 Clamp Stainless EPDM M10 40-43mm
Walraven Bifix® 1301 Clamp Stainless EPDM M8 52-56mm
Walraven 2S Clamp set zinc plated EPDM M8/10 75-81mm
Walraven Bifix® 1301 Clamp Stainless EPDM M10 31-35mm
Walraven Bifix® 1301 Clamp Stainless EPDM M8 40-43mm
Walraven Bifix® 1301 Clamp Stainless EPDM M10 25-28mm
Walraven Aero® Clamp pre-galvanized M8 TPE 150mm
Walraven Bifix® 1301 Clamp Stainless EPDM M8 31-35mm
Walraven Bifix® 1301 Clamp Stainless EPDM M8 25-28mm
Walraven Bifix® 1301 Clamp Stainless EPDM M10 15-19mm
Walraven Bifix® 1301 Clamp Stainless EPDM M8 11-14mm
Walraven Bifix® 1301 Clamp Stainless EPDM M8 15-19mm
Walraven Bifix® 1301 Clamp Stainless EPDM M8 47-51mm
Walraven 2S Clamp zinc plated EPDM M8/10 82-87mm
Walraven 2S Clamp set zinc plated EPDM M8 62-67mm
Walraven 2S Clamp zinc plated EPDM M8/10 75-81mm
Walraven 2S Clamp zinc plated EPDM M8/10 68-74mm
Walraven 2S Clamp set zinc plated EPDM M8 53-61mm
Walraven Bifix® 1301 Clamp Stainless EPDM M10 20-23mm
Walraven Bifix® 1301 Clamp Stainless EPDM M8 20-23mm
Walraven 2S Clamp set zinc plated EPDM M8 47-52mm
Walraven 2S Clamp set zinc plated EPDM M8 38-46mm

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.	2,63E-03	3,33E-07	4,33E-06	2,63E-03	3,95E-08	1,31E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,22E-08	1,89E-07	1,76E-10	-4,00E-06
ADPF	MJ	4,39E+00	1,99E-01	5,67E+00	1,03E+01	2,36E-02	4,73E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,51E-02	4,81E-02	5,35E-04	-9,30E-01
GWP	kg CO2 eq.	2,84E-01	1,30E-02	4,21E-01	7,18E-01	1,55E-03	3,43E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,61E-03	2,11E-02	1,89E-05	-5,96E-02
ODP	kg CFC11 eq.	2,24E-08	2,31E-09	2,37E-08	4,85E-08	2,74E-10	2,30E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,40E-10	4,51E-10	6,30E-12	-3,84E-09
POCP	kg ethene eq.	2,63E-04	7,87E-06	-1,21E-04	1,49E-04	9,33E-07	1,68E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,18E-06	3,02E-06	2,01E-08	-1,22E-04
AP	kg SO2 eq.	1,61E-03	5,73E-05	1,42E-03	3,08E-03	6,80E-06	1,46E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,59E-05	3,46E-05	1,38E-07	-2,15E-04
EP	kg (PO4) 3 eq.	2,30E-04	1,13E-05	3,03E-04	5,44E-04	1,34E-06	2,64E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,12E-06	4,77E-06	2,67E-08	-2,56E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	5,30E-01	5,49E-03	-1,65E-02	5,19E-01	6,51E-04	2,45E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,52E-03	4,10E-03	8,55E-06	-3,57E-02
FAETP	kg DCB eq.	8,89E-03	1,60E-04	2,02E-03	1,11E-02	1,90E-05	5,76E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,43E-05	7,85E-05	2,03E-07	2,99E-04
MAETP	kg DCB eq.	1,68E+01	5,77E-01	1,03E+01	2,76E+01	6,83E-02	1,41E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,59E-01	3,34E-01	7,25E-04	1,21E-02
TETP	kg DCB eq.	3,26E-03	1,94E-05	2,03E-03	5,32E-03	2,30E-06	3,98E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,37E-06	1,36E-05	2,15E-08	2,63E-03
ECI	euro	7,38E-02	1,57E-03	2,94E-02	1,05E-01	1,86E-04	4,98E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,35E-04	1,65E-03	2,67E-06	-7,44E-03
ADPF	kg Sb eq.	2,11E-03	9,59E-05	2,73E-03	4,93E-03	1,14E-05	2,27E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,65E-05	2,31E-05	2,57E-07	-4,47E-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.	2,93E-01	1,32E-02	4,18E-01	7,24E-01	1,56E-03	3,43E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,64E-03	1,92E-02	1,93E-05	-6,34E-02
GWP-fossil	kg CO2 eq.	2,91E-01	1,31E-02	4,17E-01	7,21E-01	1,56E-03	3,42E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,64E-03	2,12E-02	1,93E-05	-6,34E-02
GWP-biogenic	kg CO2 eq.	1,23E-03	4,91E-06	6,73E-04	1,91E-03	5,81E-07	9,87E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,36E-06	-2,01E-03	1,13E-08	0,00E+00
GWP-luluc	kg CO2 eq.	5,95E-04	4,82E-06	4,35E-04	1,03E-03	5,71E-07	5,37E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,33E-06	3,84E-06	5,37E-09	3,28E-05
ODP	kg CFC11 eq.	2,33E-08	2,90E-09	1,85E-08	4,48E-08	3,44E-10	2,13E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,03E-10	5,21E-10	7,93E-12	-3,80E-09
AP	mol H+ eq.	1,98E-03	7,63E-05	1,70E-03	3,75E-03	9,04E-06	1,78E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,11E-05	4,34E-05	1,83E-07	-2,62E-04
EP-fresh water	kg P eq.	2,25E-05	1,33E-07	7,01E-05	9,27E-05	1,57E-08	4,54E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,67E-08	2,33E-07	2,16E-10	-2,28E-06
EP-marine	kg N eq.	4,13E-04	2,69E-05	2,39E-04	6,79E-04	3,19E-06	3,27E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,43E-06	9,97E-06	6,29E-08	-4,63E-05
EP-terrestrial	mol N eq.	4,57E-03	2,96E-04	2,91E-03	7,78E-03	3,51E-05	3,73E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,19E-05	1,15E-04	6,93E-07	-5,40E-04
POCP	kg NMVOC eq.	1,49E-03	8,46E-05	3,78E-04	1,95E-03	1,00E-05	8,33E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,34E-05	3,12E-05	2,01E-07	-3,51E-04
ADP-minerals & metals	kg Sb eq.	2,63E-03	3,33E-07	4,33E-06	2,63E-03	3,95E-08	1,31E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,22E-08	1,89E-07	1,76E-10	-4,00E-06
ADP-fossil	MJ, net calorific value	4,02E+00	1,98E-01	6,13E+00	1,03E+01	2,35E-02	4,90E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,49E-02	4,91E-02	5,39E-04	-6,69E-01
WDP	m3 world eq. Deprived	1,84E-01	7,09E-04	9,11E-02	2,76E-01	8,41E-05	1,30E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,96E-04	6,78E-04	2,41E-05	-1,69E-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	1,93E-08	1,18E-09	-6,73E-09	1,38E-08	1,40E-10	5,51E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,27E-10	5,24E-10	3,55E-12	-3,75E-09
IRP	kBq U235 eq.	1,86E-02	8,31E-04	3,45E-02	5,39E-02	9,85E-05	2,72E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,30E-04	2,39E-04	2,21E-06	-9,72E-05
ETP-fw	CTUe	3,04E+01	1,77E-01	3,17E-01	3,09E+01	2,10E-02	1,46E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,89E-02	2,29E-01	3,49E-04	-2,01E+00
HTP-c	CTUh	1,84E-09	5,74E-12	-5,83E-10	1,27E-09	6,80E-13	6,31E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,59E-12	5,07E-12	8,08E-15	-1,21E-11
HTP-nc	CTUh	3,17E-08	1,93E-10	1,62E-10	3,20E-08	2,29E-11	2,14E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,35E-11	2,44E-10	2,48E-13	1,04E-08
SQP	-	1,50E+00	1,72E-01	1,67E+00	3,34E+00	2,04E-02	1,68E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,76E-02	9,47E-02	1,13E-03	-1,43E-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	3,42E-04	5,03E-07	-7,74E-06	3,35E-04	5,96E-08	1,64E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,39E-07	1,55E-07	8,05E-10	-6,66E-06
NHWD	kg	7,88E-02	1,26E-02	3,37E-02	1,25E-01	1,49E-03	6,47E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,48E-03	1,78E-03	3,66E-03	-6,03E-03
RWD	kg	1,55E-05	1,30E-06	2,89E-05	4,57E-05	1,54E-07	2,27E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,60E-07	2,84E-07	3,54E-09	-9,97E-07
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	2,64E-04	2,64E-04	0,00E+00	1,32E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	6,95E-02	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	1,60E-05	1,60E-05	0,00E+00	8,01E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	5,64E-03	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	5,37E-04	5,37E-04	0,00E+00	2,68E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,76E-02
ETE	MJ	0,00E+00	0,00E+00	9,23E-04	9,23E-04	0,00E+00	4,61E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,76E-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	4,14E-01	2,48E-03	6,87E-01	1,10E+00	2,94E-04	5,55E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,87E-04	7,43E-03	4,35E-06	-2,36E-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	4,14E-01	2,48E-03	6,87E-01	1,10E+00	2,94E-04	5,55E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,87E-04	7,43E-03	4,35E-06	-2,36E-03
PENRE	MJ	4,27E+00	2,11E-01	6,61E+00	1,11E+01	2,50E-02	5,26E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,82E-02	5,21E-02	5,72E-04	-7,02E-01
PENRM	MJ	1,53E-01	0,00E+00	0,00E+00	1,53E-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	4,42E+00	2,11E-01	6,61E+00	1,12E+01	2,50E-02	5,26E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,82E-02	5,21E-02	5,72E-04	-7,02E-01
SM	kg	3,15E-02	0,00E+00	7,72E-05	3,15E-02	0,00E+00	3,86E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NSRF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	5,53E-03	2,42E-05	1,14E-02	1,69E-02	2,86E-06	8,30E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,68E-06	4,50E-05	5,75E-07	-3,76E-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.

For Module A1, specific data for product composition was provided by the manufacturer. For Module A2, transportation data of raw materials to the production site was collected. For Module A3, energy consumption and waste data were recorded for the production year 2023/2024. Background data is sourced from the Dutch Nationale Milieudatabase v3.8 and is based on Ecoinvent 3.6.

Data Collection Period:
The dataset is representative for the production processes used in 2023/2024.

Methodology and Reproducibility:
The LCA is developed in accordance with EN15804+A2:2019, NEN-EN ISO 14040, 14044, and 14025, and follows the requirements of the NMD Bepalingsmethode v1.2 (2025). Calculations were performed using Ecochain Helix software version 4.3.1.

The life cycle stages included in this draft EPD are:

A1–A3: Raw material supply, transport, manufacturing

A4–A5: Transport to site and installation

B1–B7: Use stage (if applicable)

C1–C4: End-of-life processing

D: Benefits and loads beyond the system boundary (e.g., recycling credits).

Inventory and Allocation:
This section outlines the quantity, quality, and allocation of materials, energy flows, and emissions across relevant life cycle stages. System boundaries are defined using the modular approach as described in EN15804+A2 and the NMD Bepalingsmethode v1.2 (2025).

All manufacturing inputs were assigned to production processes and distributed to products using mass-based allocation. No secondary materials were used in the production phase. End-of-life assumptions follow standard treatment and recovery scenarios in the Dutch context. Cut-off criteria were applied to ensure that no more than 5% of mass or energy flows were excluded.

Data Sources:
Primary data was collected from Walraven's Czech Republic production site, including material composition, energy usage, transport distances, and waste outputs. Where supplier-specific data was unavailable, standard reference data for stainless steel, rubber, and coating materials were selected from Ecoinvent 3.6 and the Nationale Milieudatabase v3.8.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Modules A1–A3 – Raw Material Supply and Manufacturing
Modules A1 to A3 cover the initial life cycle stages of the stainless steel clamp. Module A1 models the extraction and processing of raw and auxiliary materials, including packaging and lubricants. The 2023/2024 bill of materials forms the basis for all material modeling. Primary materials include stainless steel, EPDM rubber lining, and a PA6 plastic insert. These components were modeled using generic datasets from the Nationale Milieudatabase (NMD) v3.8 and Ecoinvent v3.6. Stainless steel is modeled according to standard market composition of primary and secondary content, following Dutch average market assumptions. Module A2 addresses transportation of raw materials to the Walraven Czech Republic manufacturing site. Transport distances for each material were determined based on supplier logistics and modeled in compliance with EN 15804+A2:2019 using Ecoinvent 3.6 and NMD 3.8 references. A 50% load factor is assumed for all truck transport, with fully loaded deliveries to the site and empty returns, while international shipping is also considered. Module A3 represents the production stage, including electricity consumption from the grid and renewable sources, fuel and lubricating oil use, packaging materials, and waste generation such as steel scrap and EPDM offcuts. Production processes and related emissions were modeled based on primary operational data from 2023/2024. Internal recycling of stainless steel waste was incorporated proportionally to the facility's production share, and transport of waste to appropriate treatment or recycling sites was accounted for. Capital goods were excluded following the EN 15804+A2 cutoff rule, as their contribution remained below 5% of total environmental impact.

Module A4 – Transport to Installation Site
Module A4 models the transport of the final product from the production facility to customer installation sites. A standardized distance of 150 km is applied in accordance with Bepalingsmethode v1.2 (2025). Emissions were calculated using the 0001-tra&Transport, vrachtwagen dataset from NMD v3.8 and Ecoinvent v3.6, with a 50% transport load assumption.

Module A5 – Installation
Module A5 addresses the installation phase, assuming a 5% material loss during manual installation. No energy consumption is modeled as installation is non-mechanized. Transport of installation waste is included, with steel sent 100 km to landfill or recycling, and rubber and plastic sent 100 km to AVI incineration. All assumptions are in accordance with Bepalingsmethode v1.2 (2025), and material losses and waste flows were modeled per individual clamp.

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

Module C1 – Deconstruction
Module C1 reflects the manual deconstruction phase of the clamp at the end of its service life. This process is manual and does not require any energy input, so no energy consumption is modeled for this stage.

Module C2 – Transport to Waste Processing Facilities
Module C2 covers the transport of deconstructed materials to appropriate waste processing facilities. Stainless steel is transported 50 km to recycling sites, while rubber and PA6 plastic are transported 100 km to AVI incineration plants. All transport modeling is based on the 0001-tra&Transport, vrachtwagen dataset from NMD v3.8 and Ecoinvent v3.6.

Module C3 – Waste Processing
Module C3 models the processing of end-of-life materials. Stainless steel is 100% sorted and recycled, while rubber and PA6 plastic are incinerated with energy recovery at AVI facilities. Emission factors used for modeling include 0260-avC&Verbranden rubber/EPDM (27.2 MJ/kg) for rubber, 0264-avC&Verbranden kunststoffen (28.67 MJ/kg) for plastics, and 0315-reC&Sorteren en persen oud ijzer for steel. All datasets are sourced from NMD v3.8 and Ecoinvent v3.6.

Module C4 – Final Disposal
Module C4 accounts for the final disposal of residues. A residual 5% of stainless steel is sent to landfill, modeled using 0253-sto&Stort staal. Rubber and plastic are fully incinerated, and no portion is landfilled.

Module D – Benefits Beyond the System Boundary
Module D captures environmental credits beyond the product's life cycle. Steel recycling provides a 52% substitution benefit, calculated as the 95% recycling rate minus the 43% secondary input. Rubber and plastic incineration is assumed to yield 100% energy recovery, displacing fossil-based energy.

This environmental product declaration is fully compliant with EN 15804+A2:2019/AC:2021 and follows the Dutch regulatory method Bepalingsmethode v1.2 (2025). Material flows, energy use, waste, and end-of-life treatments were modeled using primary production data and internationally recognized datasets from Ecoinvent 3.6 and NMD v3.8.

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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