Environmental
Product
Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:
Walraven 4000 Clamp M8 zinc plated 100mm

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

MRPI® registration:
1.1.00938.2025

Program operator:
Stichting MRPI®
Publisher:
Stichting MRPI®
www.mrpi.nl

Date of first issue:
15-5-2025
Date of this issue:
15-5-2025
Expiry date:
15-5-2030

COMPANY INFORMATION

J. van Walraven Holding B.V.
Industrieweg 5
3641 RK
Mijdrecht
Netherlands
+31(0) 297 233000
Arunkumar Kuppusamy (info.nl@walraven.com)
https://www.walraven.com/int/

MRPI® REGISTRATION

1.1.00938.2025

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 4000 Clamp M8 zinc plated 100mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

DESCRIPTION OF PRODUCT

The Walraven 4000 Clamp M8 zinc plated 100mm is a durable two-screw pipe clamp made from steel (1.0332) with a corrosion-resistant zinc finish. It features a quick locking system and removable spacer washers, allowing use for sliding or anchoring. The oversized inner diameter and protective profile make it ideal for thermal expansion and secure pipe support.

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

The Walraven 4000 Clamp M8 zinc plated 100mm is a high-performance solution for securing plastic pipes (Ø 100 mm) in both indoor and semi-sheltered environments. Manufactured through high-precision processes in the Mijdrecht, Netherlands, the clamp delivers reliable mechanical strength and corrosion resistance through its zinc-plated steel construction, meeting the demands of modern pipe installation systems.

Manufacturing Process:
The clamp is manufactured from steel that's first flattened and cut to shape, providing a strong and stable foundation for the body. The upper and lower sections are then stamped and bent with precision to ensure they fit securely around the pipe during installation. A connecting nut is resistance-welded to the body, creating a dependable threaded connection that holds up under load. To protect the clamp over time, a high-quality zinc coating is applied, delivering long-lasting corrosion resistance that meets ISO 9227 performance standards. In the final assembly stage, locking screws, nuts, a POM anti-loss washer, and a PP nut holder are pre-installed, making the product quick to handle and easy to install on site while reducing the chance of misplaced components.

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

Reference: 0573-pro & Elektriciteit, hernieuwbaar, uit PV, bij consument, per kWh, Database: Ecoinvent v3.6 (Cut-off, NMD+EI), GWP : 0.095 kg CO2-eq /kWh

Environmental and Installation Features:
Corrosion Protection: The zinc coating provides effective protection against environmental exposure, eliminating the need for on-site treatment and reducing environmental impact.

Packaging and Transport:
The Walraven 4000 Clamp is delivered in recyclable cardboard packaging with clear labeling for convenient identification and transport.

Name - Half parts	
Steel - Lower part	
Steel - Upper part	
Steel - Hollow pan head screw	
Steel - Nut	
Plastic - Nut holder	
Plastic - Anti-loss washer	
Plastic- Spacer 5000 cream	

Total Weight	107g

Component (> 1%)	(%)
Steel (combined)	96,10%

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 4000 Clamps, which confirms a minimum working life of 50 years under appropriate usage and maintenance conditions.

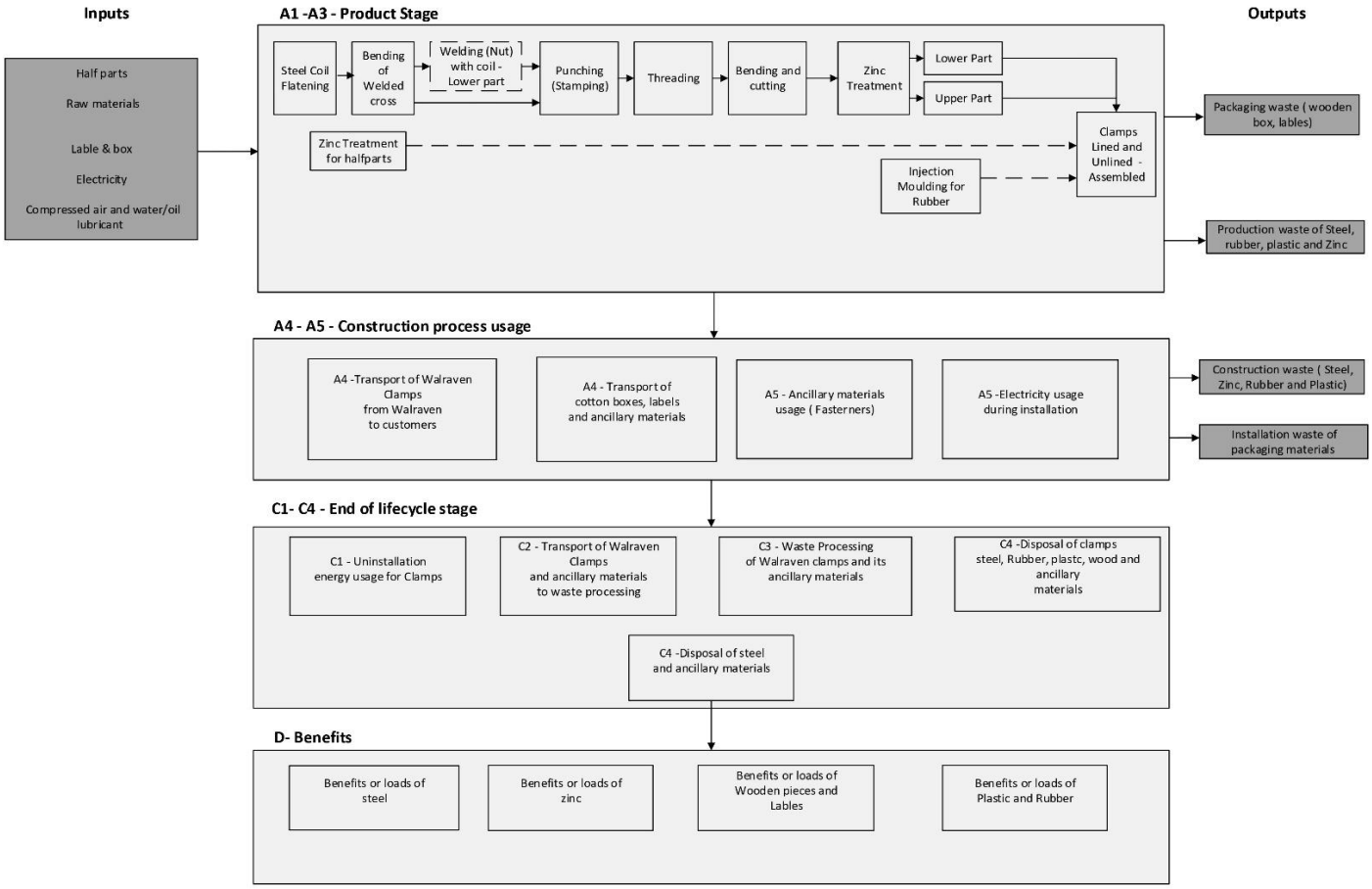
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental 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 4000 Clamp M8 zinc plated 100mm. 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 3000 Clamp zinc plated M8 90mm
Walraven 4000 Clamp M8 BUP 100mm
Walraven Double Wall Clamp pre-galvanized EPDM Pin 120 3/8"-18mm
Walraven 4000 Clamp M8 zinc plated 100mm
Walraven Double Wall Clamp pre-galvanized Pin 120 28mm
Walraven 3000 Clamp zinc plated M8 80mm
Walraven Double Wall Clamp pre-galvanized Pin 90 28mm
Walraven 4000 Clamp M8 BUP 90mm
Walraven 4000 Clamp M8 zinc plated 90mm
Walraven Double Wall Clamp pre-galvanized Pin 120 22mm
Walraven 3000 Clamp zinc plated M8 75mm
Walraven Duplo Double Pipe Clamp pre-galvanized 15mm
Walraven Bifix® G2 Clamp BUP M8/10 80-83mm
Walraven 4000 Clamp M8 BUP 80mm
Walraven Double Wall Clamp pre-galvanized Pin 90 22mm

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.	6,05E-03	2,13E-06	4,28E-07	6,06E-03	5,49E-08	2,84E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,15E-08	1,59E-07	2,93E-10	-3,72E-04
ADPF	MJ	7,34E+00	1,28E+00	4,29E-01	9,05E+00	3,28E-02	3,95E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,47E-02	4,03E-02	8,86E-04	-1,27E+00
GWP	kg CO2 eq.	4,98E-01	8,36E-02	2,34E-02	6,05E-01	2,15E-03	2,61E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,58E-03	6,02E-03	3,15E-05	-9,42E-02
ODP	kg CFC11 eq.	3,61E-08	1,48E-08	2,27E-09	5,32E-08	3,81E-10	2,54E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,35E-10	4,45E-10	1,04E-11	-3,86E-09
POCP	kg ethene eq.	4,15E-04	5,08E-05	2,07E-07	4,66E-04	1,30E-06	1,47E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,16E-06	2,54E-06	3,34E-08	-1,77E-04
AP	kg SO2 eq.	3,01E-03	3,77E-04	3,97E-05	3,43E-03	9,44E-06	1,55E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,57E-05	2,82E-05	2,29E-07	-3,84E-04
EP	kg (PO4) 3 eq.	4,34E-04	7,31E-05	7,09E-06	5,14E-04	1,86E-06	2,37E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,09E-06	3,64E-06	4,43E-08	-4,87E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	8,72E-01	3,53E-02	2,16E-03	9,10E-01	9,04E-04	4,28E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,51E-03	3,56E-03	1,52E-05	-6,06E-02
FAETP	kg DCB eq.	1,82E-02	1,03E-03	8,59E-05	1,93E-02	2,64E-05	9,58E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,40E-05	7,44E-05	9,37E-07	-2,65E-04
MAETP	kg DCB eq.	3,33E+01	3,70E+00	3,41E-01	3,73E+01	9,50E-02	1,84E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,58E-01	3,06E-01	1,29E-03	-9,94E-01
TETP	kg DCB eq.	5,35E-03	1,24E-04	1,82E-04	5,66E-03	3,20E-06	4,85E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,33E-06	1,10E-05	3,81E-08	4,02E-03
ECI	euro	1,26E-01	1,01E-02	1,67E-03	1,38E-01	2,59E-04	6,34E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,31E-04	8,09E-04	4,55E-06	-1,25E-02
ADPF	kg Sb eq.	3,53E-03	6,14E-04	2,06E-04	4,35E-03	1,58E-05	1,90E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,63E-05	1,94E-05	4,26E-07	-6,12E-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.	5,11E-01	8,44E-02	-3,41E-03	5,92E-01	2,17E-03	2,52E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,61E-03	6,08E-03	3,21E-05	-1,00E-01
GWP-fossil	kg CO2 eq.	5,08E-01	8,43E-02	2,34E-02	6,15E-01	2,17E-03	2,64E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,61E-03	6,06E-03	3,21E-05	-1,00E-01
GWP-biogenic	kg CO2 eq.	2,54E-03	3,14E-05	-5,00E-07	2,57E-03	8,08E-07	1,28E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,35E-06	2,70E-03	2,04E-08	0,00E+00
GWP-luluc	kg CO2 eq.	1,17E-03	3,10E-05	-5,55E-07	1,20E-03	7,94E-07	6,10E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,32E-06	3,38E-06	8,95E-09	1,32E-05
ODP	kg CFC11 eq.	3,67E-08	1,86E-08	2,47E-09	5,78E-08	4,78E-10	2,82E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,97E-10	5,00E-10	1,31E-11	-3,19E-09
AP	mol H+ eq.	3,72E-03	5,01E-04	5,35E-05	4,28E-03	1,26E-05	1,94E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,09E-05	3,53E-05	3,03E-07	-4,72E-04
EP-fresh water	kg PO4 eq.	4,28E-05	8,48E-07	4,55E-07	4,41E-05	2,18E-08	1,99E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,64E-08	2,00E-07	3,64E-10	-4,65E-06
EP-marine	kg N eq.	7,92E-04	1,75E-04	1,09E-05	9,78E-04	4,43E-06	4,53E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,38E-06	7,85E-06	1,05E-07	-9,25E-05
EP-terrestrial	mol N eq.	8,80E-03	1,93E-03	1,65E-04	1,09E-02	4,88E-05	5,02E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,13E-05	9,10E-05	1,15E-06	-1,07E-03
POCP	kg NMVOC eq.	2,70E-03	5,50E-04	2,68E-05	3,27E-03	1,39E-05	1,38E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,32E-05	2,48E-05	3,35E-07	-5,71E-04
ADP-minerals & metals	kg Sb eq.	6,05E-03	2,13E-06	4,28E-07	6,06E-03	5,49E-08	2,84E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,15E-08	1,59E-07	2,93E-10	-3,72E-04
ADP-fossil	MJ, net calorific value	6,79E+00	1,27E+00	3,98E-01	8,46E+00	3,27E-02	3,87E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,44E-02	4,10E-02	8,95E-04	-8,60E-01
WDP	m3 world eq. Deprived	3,52E-01	4,53E-03	5,38E-03	3,62E-01	1,17E-04	1,65E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,95E-04	5,52E-04	3,77E-05	-3,25E-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	3,16E-08	7,54E-09	8,22E-11	3,92E-08	1,95E-10	1,74E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,24E-10	4,36E-10	5,90E-12	-5,47E-09
IRP	kBq U235 eq.	3,51E-02	5,32E-03	6,61E-04	4,11E-02	1,37E-04	2,07E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,28E-04	2,03E-04	3,72E-06	-1,79E-04
ETP-fw	CTUe	6,44E+01	1,13E+00	2,13E-01	6,57E+01	2,91E-02	2,99E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,86E-02	2,08E-01	8,35E-04	-6,19E+00
HTP-c	CTUh	3,29E-09	3,68E-11	-1,12E-11	3,31E-09	9,45E-13	1,61E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,58E-12	4,66E-12	1,53E-14	-9,37E-11
HTP-nc	CTUh	6,18E-08	1,24E-09	1,58E-10	6,32E-08	3,19E-11	3,86E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,31E-11	2,06E-10	6,15E-13	1,38E-08
SQP	-	2,79E+00	1,10E+00	5,03E-01	4,39E+00	2,83E-02	2,15E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,72E-02	7,87E-02	1,90E-03	-2,40E-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	7,83E-04	3,21E-06	1,56E-06	7,88E-04	8,28E-08	3,65E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,38E-07	1,21E-07	1,32E-09	-5,82E-05
NHWD	kg	1,32E-01	8,02E-02	7,55E-04	2,13E-01	2,07E-03	1,08E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,45E-03	1,18E-03	5,92E-03	-1,03E-02
RWD	kg	2,72E-05	8,35E-06	6,30E-07	3,62E-05	2,15E-07	1,82E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,58E-07	2,38E-07	5,88E-09	-6,46E-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-04	1,51E-04	0,00E+00	7,55E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	1,08E-01	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	5,31E-06	5,31E-06	0,00E+00	2,65E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	1,23E-03	0,00E+00
EEE	MJ	0,00E+00	0,00E+00	3,36E-04	3,36E-04	0,00E+00	1,68E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,23E-03
ETE	MJ	0,00E+00	0,00E+00	1,96E-04	1,96E-04	0,00E+00	9,78E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,36E-03

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	7,75E-01	1,59E-02	1,58E-01	9,49E-01	4,09E-04	4,72E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,82E-04	6,32E-03	1,02E-05	-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	7,75E-01	1,59E-02	1,58E-01	9,49E-01	4,09E-04	4,72E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,82E-04	6,32E-03	1,02E-05	-1,24E-02
PENRE	MJ	7,22E+00	1,35E+00	4,35E-01	9,01E+00	3,47E-02	4,12E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,78E-02	4,35E-02	9,50E-04	-9,00E-01
PENRM	MJ	2,98E-02	0,00E+00	0,00E+00	2,98E-02	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	7,25E+00	1,35E+00	4,35E-01	9,04E+00	3,47E-02	4,12E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,78E-02	4,35E-02	9,50E-04	-9,00E-01
SM	kg	4,87E-02	0,00E+00	4,58E-05	4,87E-02	0,00E+00	2,29E-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	1,06E-02	1,54E-04	1,77E-04	1,10E-02	3,98E-06	5,12E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,63E-06	2,32E-05	9,66E-07	-7,76E-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

1. Data Quality
Primary data from Walraven's internal production records, including energy use, materials, and logistics, has been applied wherever available. In cases where detailed component data, such as rubber composition or galvanized steel thickness, was missing, verified generic datasets from Ecoinvent 3.6 and NMD v3.8 were used for modeling materials, emissions, and transport.

2. Data Collection Period
All data reflects production conditions and methods relevant to the 2023 and 2024 period, ensuring that environmental impacts are representative of current practices.

3. Methodology and Reproducibility
The life cycle assessment follows the EN 15804+A2 standard, version 1.2 (2025), and the NMD Bepalingsmethode version 1.2. Grouping and allocation criteria are applied to ensure comparability: if the 100 mm clamp falls within plus or minus 20 percent of the environmental impact of a larger 4000 series variant, such as the 160 mm clamp, it may be grouped under a worst-case reference scenario using the larger product as a baseline. End-of-life stages, including modules C2 to C4 and D, follow standardized disposal and recycling pathways as prescribed in EN 15804+A2, ensuring consistent accounting of impacts.

4. Inventory and Allocation
The assessment uses a cradle-to-grave system boundary, including raw material extraction, transport, manufacturing, installation, and end-of-life. Material composition is primarily galvanized steel, with any rubber lining assumed similar to other 4000 series clamps unless otherwise specified. Transport and installation distances are based on Walraven logistics inputs, including distances from steel suppliers, intermediaries, and site delivery.

5. Allocation Method
A worst-case approach is applied for grouping purposes. If the 100 mm clamp's environmental impacts are within 20 percent of the 160 mm variant, the products can be grouped under the same reference scenario.

6. Data Sources
Primary data originates from Walraven production, materials, and logistics departments. Secondary sources include NMD v3.8 and Ecoinvent 3.6 datasets for steel, emissions, and transport profiles where primary data is unavailable. The Walraven 4000 Clamp M8 zinc plated 100 mm may serve as the reference product if its impacts are within 20 percent of larger 4000 series variants.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Modules A1 to A3 cover the upstream and core manufacturing phases of the Walraven 4000 Clamp M8 zinc plated 100 mm. Module A1 includes all raw and auxiliary materials used in production, based on verified 2023–2024 Bills of Materials. Key materials comprise steel (grade 1.0332) for clamp bodies, screws, and nuts, EPDM rubber for linings, PA6 polyamide plastic for smaller components, and zinc for corrosion-resistant coating. Material data were sourced from NMD v3.8 and Ecoinvent v3.6, applying generic references where primary data were unavailable. Steel inputs are modeled with a 57% primary and 43% secondary content split, reflecting market averages from NMD.

Module A2 accounts for transportation of raw materials to the Walraven production facility in Mijdrecht. Distances vary by material. Transport modeling follows EN 15804+A2:2019/AC:2021 with a 50% average truck load factor (full to site, empty return), using 0001-tra&Transport, vrachtwagen (freight, lorry, unspecified {GLO}) from NMD v3.8 and Ecoinvent v3.6.

Module A3 models production at Walraven Mijdrecht, including electricity consumption from the Dutch grid and rooftop solar PV, additional energy for zinc coating, production waste primarily consisting of steel scrap with partial internal recycling, and use of lubricating oil as an auxiliary input. Waste and recycling quantities are proportionally allocated based on the clamp's share of total factory output. Capital goods are excluded according to EN 15804+A2 cutoff rules (contribution below 5% of total environmental impact).

Module A4 covers transportation of the finished clamp to construction or installation sites. A standard distance of 150 km is applied, based on Bepalingsmethode v1.2 (2025), assuming a 50% truck load factor. Transport emissions are calculated using the same 0001-tra&Transport, vrachtwagen dataset from NMD v3.8 and Ecoinvent v3.6.

Module A5 captures the installation phase. A 5% material loss is assumed due to manual handling inefficiencies. No energy input is modeled, as installation is performed manually. Installation waste is transported to processing facilities: steel is sent 100 km to landfill or recycling, and rubber and plastic are sent 100 km to AVI incineration plants.

End-of-life fractions follow the Bepalingsmethode v1.2 (2025) guidelines.

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

Module C1 addresses the manual deconstruction of the clamp at the end of its service life. No energy consumption is associated with this stage.

Module C2 models transport of deconstructed materials to the appropriate processing facilities. Steel and zinc are transported 50 km to recycling or landfill sites, while rubber and plastic are transported 100 km to AVI incineration plants. Transport emissions are calculated using 0001-tra&Transport, vrachtwagen from NMD v3.8 and Ecoinvent v3.6.

Module C3 covers end-of-life waste processing. Steel and zinc are fully sorted and recycled, while rubber and plastic are fully incinerated with energy recovery at AVI facilities. Emissions are modeled using 0264-avC&Verbranden kunststoffen (28.67 MJ/kg) for plastics, 0315-reC&Sorteren en persen oud ijzer for steel, and 0260-avC&Verbranden rubber/EPDM (27.2 MJ/kg) for rubber. All datasets are sourced from NMD v3.8 and Ecoinvent v3.6.

Module C4 considers the final disposal of residues. A residual 5% of steel and zinc is sent to landfill, using 0253-sto&Stort staal for steel and 0248-sto&Stort koper, lood, verzinkt staal, zink for zinc.

Module D quantifies environmental benefits arising beyond the product's life cycle. Steel recycling provides a 52% substitution benefit, calculated as the 95% recycling rate minus 43% secondary content. Zinc recycling is modeled with a 95% efficiency. Rubber and plastic incineration at AVI plants is credited with 100% energy recovery, displacing fossil-based electricity.

This environmental declaration is prepared in accordance with EN 15804+A2:2019/AC:2021 and follows the Dutch LCA methodology outlined in Bepalingsmethode v1.2 (2025). All material, energy, waste, and transport data reflect verified inputs from Walraven and are modeled using NMD v3.8 and Ecoinvent v3.6 databases.

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

REFERENCES

[1] ISO, ISO 14040: Environmental management – Life cycle assessment – Principles and Framework, ISO 14040:2006 + Amd 1:2020, International Organization for Standardization, 2020.

[2] ISO, ISO 14044: Environmental management – Life cycle assessment – Requirements and guidelines, ISO 14044:2006 + Amd 2:2020, International Organization for Standardization, 2020.

[3] ISO, ISO 14025: Environmental labels and declarations – Type III environmental declarations – Principles and procedures, ISO 14025:2006, International Organization for Standardization, 2006.

[4] European Technical Assessment (ETA) for Walraven Bifix® G2 Clamps, Walraven, Mijdrecht, 2024.

[5] NMD, Bepalingsmethode ‘Milieuprestatie Bouwwerken’ versie 1.2 inclusief de bijbehorende wijzigingsbladen, Nationale Milieudatabase, 2025.

[6] CE Delft, Handboek Schaduwprijzen, 2010. [Online]. Available: https://ce.nl/publicaties/handboek-schaduwprijzen-waardering-en-weging-van-emissies-en-milieueffecten/

[7] TNO, Toxiciteit heeft z'n prijs: schaduwprijzen voor (eco-)toxiciteit en uitputting van abiotische grondstoffen binnen DuboCalc. [Online]. Available: https://puc.overheid.nl/rijkswaterstaat/doc/PUC_119145_31/

[8] NEN, NEN-EN 15804: Duurzaamheid van bouwwerken – Milieuverklaringen van producten – Basisregels voor de productgroep bouwproducten, NEN-EN 15804:2012 + A2:2019 + AC:2021, Nederlands Normalisatie-instituut, 2021.

[9] P. P. Lahoti and V. D. M., Lubrication in cold rolling of steel, Journal of Materials Processing Technology, vol. 209, no. 9, pp. 4638–4642, 2009.

[10] F. G. H. van Wees, J. V. B., J. O. P. R., Energy Consumption for Steel Production, in World Energy Conference, Cannes, Nov. 1986.

[11] The Engineering Toolbox, 2001. [Online]. Available: https://www.engineeringtoolbox.com/

[12] NMD, Environmental Performance Assessment Method for Construction Works, January 2025. [Online]. Available: https://milieudatabase.nl/wp-content/uploads/2022/05/Bepalingsmethode_Milieuprestatie_Bouwwerken_maart_2022_Engels.pdf.