Environmental
Product
Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:
Walraven Bifix® 300 Clamp Stainless M8 25-28mm

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

MRPI® registration:
1.1.00951.2025

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/

PRODUCT

Walraven Bifix® 300 Clamp Stainless M8 25-28mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

DESCRIPTION OF PRODUCT

Stainless steel two-screw clamp with quick locking system, made from high grade AISI 316L (1.4404). Ideal for secure and corrosion resistant pipe fastening.

MRPI® REGISTRATION

1.1.00951.2025

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

1043 GR

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 Bifix® 300 Clamp Stainless M8 (25–28 mm) is a high-quality, corrosion-resistant two-screw pipe clamp manufactured from AISI 316L (1.4404) stainless steel. Designed for reliable mechanical support, it provides excellent durability in indoor and semi-sheltered environments. The clamp is lightweight, pre-assembled, and suitable for small- to medium-diameter pipe installations.

Manufacturing Location
The clamp is produced at Walraven's certified manufacturing facility in the Horka, Czech Republic, adhering to strict environmental and quality management standards.

Manufacturing Process Overview
The clamp body is formed from high-grade stainless steel AISI 316L (1.4404), ensuring inherent corrosion resistance and mechanical strength. Assembly involves a quick-locking system with stainless steel screws. No additional coatings are required due to the material's durability. The clamp is delivered fully assembled, facilitating fast and safe on-site 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 Performance
The product demonstrates excellent corrosion resistance, with optimized stainless steel use for material efficiency. The life cycle modeling was conducted using Ecochain Helix software and Ecoinvent v3.6 data. The clamp has a long reference service life of 50 years and is free of substances of very high concern (SVHCs).

Installation and Use Phase
The pre-assembled design enables rapid installation, making it suitable for various mechanical and utility pipe support applications. The product is VOC-free and safe for use in clean indoor environments. 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 disassembled, and all stainless steel components are recyclable. Module D benefits are accounted for, including positive environmental credits from stainless steel recycling.

Packaging and Transport
The clamp is packaged in recyclable, eco-friendly cardboard and transported using Euro 5/6 standard trucks. Packaging is designed for low-volume storage and stacking efficiency.

The product meets EN 15804 + A2 and ISO 14025 standards for environmental product declarations. The stainless steel material ensures long-term durability and corrosion resistance, with a reference service life of up to 50 years in indoor or semi-sheltered installations.

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

Total Weight	37 g

Component (> 1%)	(%)
Steel (combined)	96,41%

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.

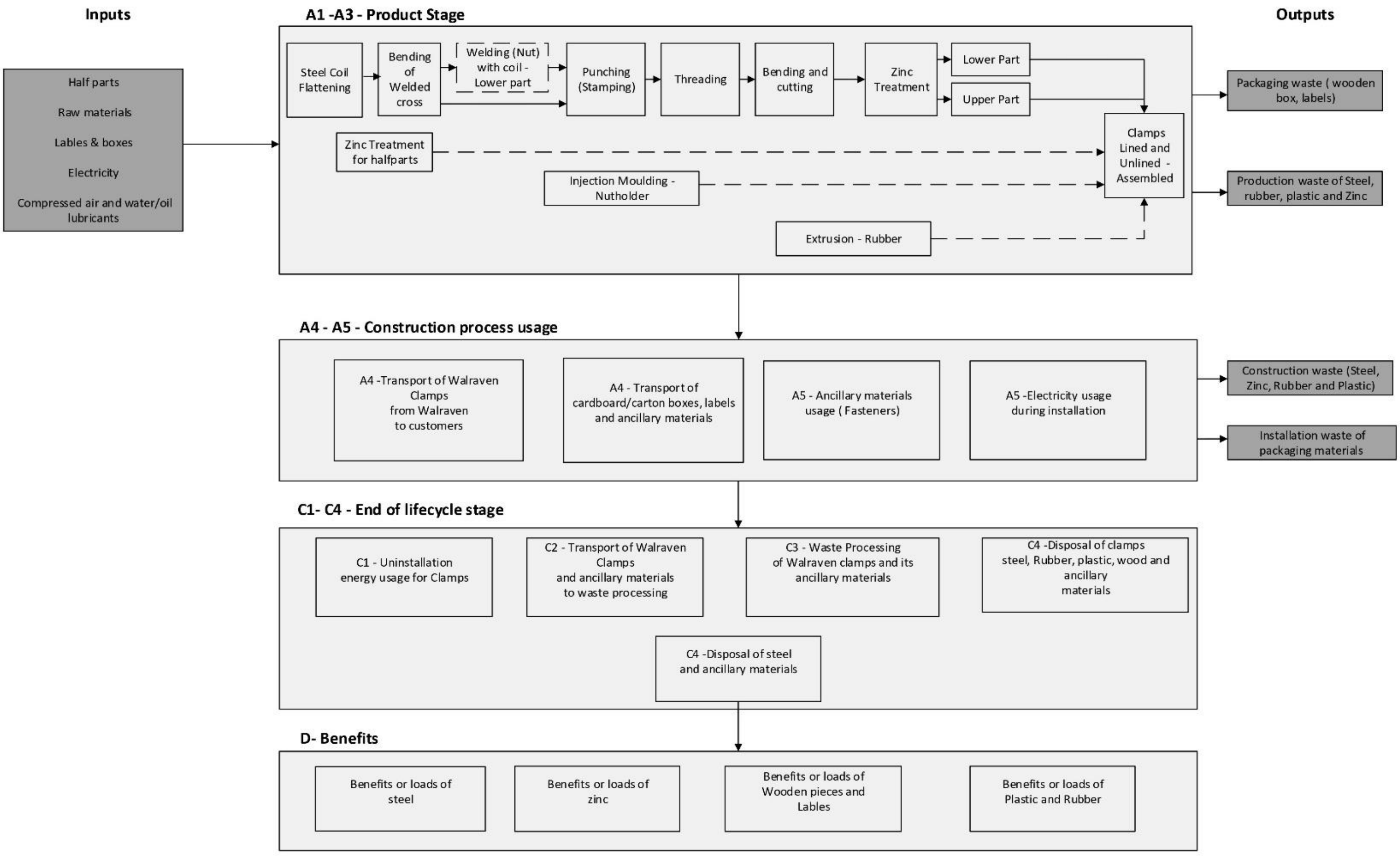
This comprehensive approach ensures a scientifically sound and holistic understanding of the Walraven Clamp's environmental footprint throughout its full life cycle.

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

walraven



REPRESENTATIVENESS

The aggregation was done by choosing the reference product as Walraven Bifix® 300 Clamp Stainless M8 25-28mm. 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 set zinc plated M8/10 75-81mm
Walraven Bifix® 300 Clamp Stainless M10 62-68mm
Walraven Nail-in Clamp pre-galvanized ST P80 1/2"
Walraven Bifix® 300 Clamp Stainless M8 31-35mm
Walraven Nail-in Clamp pre-galvanized ST P80 3/4"
Walraven Bifix® 300 Clamp Stainless M8 25-28mm
Walraven Bifix® 300 Clamp Stainless M8 20-22mm
Walraven Bifix® 300 Clamp Stainless M8 54-60mm
Walraven Pipe Saddle hot dip galvanized 33.7mm 1"
Walraven Bifix® 300 Clamp Stainless M8 15-19mm
Walraven Pipe Saddle hot dip galvanized 26.9mm 3/4"
Walraven Pipe Saddle hot dip galvanized 21.5mm 1/2"

ENVIRONMENTAL IMPACT per functional unit or declared unit (indicators A1)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	kg Sb eq.	1,76E-03	2,11E-07	4,33E-06	1,77E-03	1,90E-08	8,83E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,16E-08	9,44E-08	9,53E-11	-1,98E-08
ADPF	MJ	2,36E+00	1,26E-01	5,67E+00	8,16E+00	1,14E-02	3,93E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,89E-02	2,30E-02	2,89E-04	-3,51E-01
GWP	kg CO2 eq.	1,62E-01	8,24E-03	4,21E-01	5,91E-01	7,43E-04	2,84E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,24E-03	1,68E-03	1,02E-05	-2,73E-02
ODP	kg CFC11 eq.	1,19E-08	1,46E-09	2,37E-08	3,72E-08	1,32E-10	1,84E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,20E-10	2,10E-10	3,40E-12	-9,52E-10
POCP	kg ethene eq.	1,38E-04	4,97E-06	-1,21E-04	2,14E-05	4,48E-07	-1,77E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,47E-07	1,48E-06	1,09E-08	-5,94E-05
AP	kg SO2 eq.	9,46E-04	3,62E-05	1,42E-03	2,40E-03	3,27E-06	1,17E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,44E-06	1,65E-05	7,48E-08	-9,25E-05
EP	kg (PO4) 3 eq.	1,37E-04	7,12E-06	3,03E-04	4,47E-04	6,42E-07	2,20E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,07E-06	2,11E-06	1,44E-08	-1,10E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	2,94E-01	3,47E-03	-1,65E-02	2,81E-01	3,13E-04	1,33E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,21E-04	2,04E-03	4,62E-06	-1,71E-02
FAETP	kg DCB eq.	5,66E-03	1,01E-04	2,02E-03	7,78E-03	9,13E-06	4,03E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,52E-05	3,80E-05	1,10E-07	2,12E-04
MAETP	kg DCB eq.	1,02E+01	3,64E-01	1,03E+01	2,08E+01	3,28E-02	1,06E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,47E-02	1,65E-01	3,92E-04	1,77E-01
TETP	kg DCB eq.	1,89E-03	1,23E-05	2,03E-03	3,93E-03	1,11E-06	2,69E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,84E-06	6,35E-06	1,16E-08	1,43E-03
ECI	euro	4,16E-02	9,93E-04	2,94E-02	7,20E-02	8,95E-05	3,46E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,49E-04	3,76E-04	1,44E-06	-3,41E-03
ADPF	kg Sb eq.	1,13E-03	6,06E-05	2,73E-03	3,92E-03	5,46E-06	1,89E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,10E-06	1,11E-05	1,39E-07	-1,69E-04

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

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

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	1,66E-01	8,32E-03	4,18E-01	5,92E-01	7,50E-04	2,83E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,25E-03	1,69E-04	1,04E-05	-2,93E-02
GWP-fossil	kg CO2 eq.	1,65E-01	8,31E-03	4,17E-01	5,90E-01	7,49E-04	2,82E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,25E-03	1,70E-03	1,04E-05	-2,93E-02
GWP-biogenic	kg CO2 eq.	7,81E-04	3,10E-06	6,73E-04	1,46E-03	2,79E-07	7,53E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,66E-07	-1,53E-03	6,09E-09	0,00E+00
GWP-luluc	kg CO2 eq.	4,05E-04	3,05E-06	4,35E-04	8,44E-04	2,74E-07	4,34E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,57E-07	1,90E-06	2,90E-09	2,16E-05
ODP	kg CFC11 eq.	1,21E-08	1,83E-09	1,85E-08	3,25E-08	1,65E-10	1,62E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,76E-10	2,44E-10	4,29E-12	-7,15E-10
AP	mol H+ eq.	1,17E-03	4,82E-05	1,70E-03	2,91E-03	4,34E-06	1,42E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,24E-06	2,06E-05	9,89E-08	-1,13E-04
EP-fresh water	kg PO4 eq.	1,38E-05	8,38E-08	7,01E-05	8,39E-05	7,56E-09	4,15E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,26E-08	1,16E-07	1,17E-10	-1,03E-06
EP-marine	kg N eq.	2,46E-04	1,70E-05	2,39E-04	5,02E-04	1,53E-06	2,45E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,55E-06	4,55E-06	3,40E-08	-2,10E-05
EP-terrestrial	mol N eq.	2,73E-03	1,87E-04	2,91E-03	5,83E-03	1,69E-05	2,84E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,81E-05	5,28E-05	3,75E-07	-2,45E-04
POCP	kg NMVOC eq.	8,49E-04	5,35E-05	3,78E-04	1,28E-03	4,82E-06	5,71E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,03E-06	1,44E-05	1,09E-07	-1,67E-04
ADP-minerals & metals	kg Sb eq.	1,76E-03	2,11E-07	4,33E-06	1,77E-03	1,90E-08	8,83E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,16E-08	9,44E-08	9,53E-11	-1,98E-08
ADP-fossil	MJ, net calorific value	2,18E+00	1,25E-01	6,13E+00	8,44E+00	1,13E-02	4,14E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,88E-02	2,36E-02	2,91E-04	-2,05E-01
WDP	m3 world eq. Deprived	1,09E-01	4,48E-04	9,11E-02	2,00E-01	4,04E-05	9,75E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,73E-05	2,37E-04	1,31E-05	-5,59E-03

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	1,04E-08	7,46E-10	-6,73E-09	4,37E-09	6,73E-11	1,56E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,12E-10	2,59E-10	1,92E-12	-1,69E-09
IRP	kBq U235 eq.	1,12E-02	5,25E-04	3,45E-02	4,63E-02	4,73E-05	2,35E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,89E-05	1,17E-04	1,19E-06	5,01E-04
ETP-fw	CTUe	1,93E+01	1,12E-01	3,17E-01	1,98E+01	1,01E-02	9,45E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,68E-02	1,01E-01	1,89E-04	-9,82E-01
HTP-c	CTUh	1,07E-09	3,63E-12	-5,83E-10	4,87E-10	3,27E-13	2,43E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,45E-13	2,47E-12	4,37E-15	-3,75E-12
HTP-nc	CTUh	1,93E-08	1,22E-10	1,62E-10	1,96E-08	1,10E-11	1,27E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,84E-11	1,17E-10	1,34E-13	5,68E-09
SQP	-	8,76E-01	1,09E-01	1,67E+00	2,66E+00	9,80E-03	1,34E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,63E-02	4,75E-02	6,11E-04	-4,52E-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	2,29E-04	3,18E-07	-7,74E-06	2,21E-04	2,86E-08	1,09E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,77E-08	7,11E-08	4,35E-10	-3,51E-06
NHWD	kg	4,39E-02	7,95E-03	3,37E-02	8,56E-02	7,17E-04	4,36E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,19E-03	6,89E-04	1,98E-03	-2,87E-03
RWD	kg	8,84E-06	8,23E-07	2,89E-05	3,86E-05	7,42E-08	1,95E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,24E-07	1,40E-07	1,91E-09	1,73E-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	3,76E-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	0,00E+00	0,00E+00
EEE	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	0,00E+00
ETE	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	0,00E+00

HWD = Hazardous Waste Disposed
NHWD = Non Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
CRU = Components for reuse
MFR = Materials for recycling
MER = Materials for energy recovery
EEE = Exported Electrical Energy
ETE = Exported Thermal Energy

RESOURCE USE per functional unit or declared unit (A1 and A2)

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	2,50E-01	1,57E-03	6,87E-01	9,39E-01	1,41E-04	4,74E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,36E-04	3,70E-03	2,35E-06	5,95E-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	2,50E-01	1,57E-03	6,87E-01	9,39E-01	1,41E-04	4,74E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,36E-04	3,70E-03	2,35E-06	5,95E-03
PENRE	MJ	2,32E+00	1,33E-01	6,61E+00	9,06E+00	1,20E-02	4,45E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,00E-02	2,50E-02	3,09E-04	-2,12E-01
PENRM	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
PENRT	MJ	2,32E+00	1,33E-01	6,61E+00	9,06E+00	1,20E-02	4,45E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,00E-02	2,50E-02	3,09E-04	-2,12E-01
SM	kg	1,70E-02	0,00E+00	7,72E-05	1,71E-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	3,32E-03	1,53E-05	1,14E-02	1,47E-02	1,38E-06	7,31E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,29E-06	1,12E-05	3,11E-07	-1,06E-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 were modelled to reflect actual production processes as accurately as possible. The assessment prioritizes primary data collected directly from Walraven's Czech Republic production facility. In cases where primary data was unavailable, representative background datasets were selected from validated sources, including the Dutch Nationale Milieudatabase v3.8, based on Ecoinvent 3.6.

For Module A1, material composition data was provided by the manufacturer. Module A2 includes actual transport distances for all raw materials to the production site. Module A3 incorporates measured energy consumption, waste generation, and emissions for the 2022 production year. All secondary data and background processes comply with recognized LCA standards.

Data Collection Period

The dataset represents the production processes carried out in 2023/2024.

Methodology and Reproducibility

The LCA was conducted in accordance with EN15804+A2:2019, ISO 14040, ISO 14044, ISO 14025, and the NMD Bepalingsmethode v1.2 (2025). All modelling and environmental impact calculations were performed using Ecochain Helix software (version 4.3.1). The study covers life cycle modules A1–A3 (raw material supply, transport, and manufacturing), A4–A5 (transport to site and installation), C1–C4 (end-of-life processing), and D (benefits from recycling and energy recovery).

Inventory and Allocation

System boundaries and allocation follow the modular approach outlined in EN15804 and NMD Bepalingsmethode v1.2 (2025). All relevant material and energy flows, emissions, and waste streams were included. Mass-based allocation was applied to distribute shared site-level inputs, such as electricity and auxiliary materials, across individual products. No secondary materials were used during production, and cut-off criteria were applied to ensure that any excluded flows account for less than 5% of total mass or energy per module.

Data Sources

Primary data was collected from Walraven's Czech facility, covering material composition, energy consumption, and transport distances. Where primary data was incomplete or unavailable, verified secondary datasets from Ecoinvent 3.6 and the Nationale Milieudatabase v3.8 were used, including references for steel, zinc coating, and transport emissions. Upstream and downstream processes such as coating, shipping, and waste treatment were also modeled using these verified datasets to ensure comprehensive and reliable results.

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 Bifix® 300 Clamp Stainless M8 25-28mm. The primary materials in this clamp include various grades of stainless steel and zinc coating. The material inventory is based on the 2023/2024 production year, using bills of materials and environmental data from the Nationale Milieudatabase (NMD) v3.8 and Ecoinvent v3.6. Where necessary, generic datasets were used. Steel content is modeled with 57% primary and 43% secondary (recycled) composition, aligning with standard market assumptions in the Dutch LCA framework.

Module A2 addresses the inbound transport of materials to the Walraven production site in the Czech Republic. Transport was modeled using EN 15804+A2 guidelines with a 50% load factor assumption (fully loaded inbound, empty outbound). Emissions were calculated using NMD v3.8 and Ecoinvent v3.6 references for unspecified freight lorries (0001-tra&Transport, vrachtwagen). Individual distances per material were recorded but are generalized in the model.

Module A3 evaluates the manufacturing phase. This includes electricity and auxiliary material use, packaging, and waste generation based on 2023/2024 operational data. Inputs consist of grid electricity (for both clamp production and zinc treatment), fuels, and lubricating oil. Packaging and steel production waste (scrap) are included, with recycled fractions modeled based on proportional allocation. Capital goods are excluded in accordance with the cutoff rule under EN 15804+A2, as their contribution to total environmental impact is less than 5%.

Module A4 covers distribution of the finished clamp from the production site to the customer. A standardized distance of 150 km was assumed in accordance with the Bepalingsmethode v1.2, using a 50% truck load factor. Transport emissions were modeled with unspecified lorry datasets from NMD v3.8 / Ecoinvent v3.6.

Module A5 includes installation activities and associated losses. Installation is performed manually and requires no additional energy. A 5% material loss is assumed due to handling inefficiencies. Installation waste is categorized and routed to waste processing: steel waste is transported 100 km to landfill or recycling, and rubber or plastic packaging (if present) is transported 100 km to AVI incineration. These assumptions follow default values in the Bepalingsmethode v1.2 (2025).

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 – Deconstruction
The clamp is assumed to be manually uninstalled at the end of its service life, requiring negligible energy input. This approach reflects practical on-site dismantling and avoids additional operational emissions.

Module C2 – Transport to Waste Processing
Once removed, waste materials are transported to appropriate treatment facilities. Steel and zinc components travel 50 km to recycling or landfill sites, while rubber and plastics are transported 100 km to AVI incineration plants. Emissions from transport are calculated using ton-kilometer factors based on standard NMD and Ecoinvent datasets.

Module C3 – Waste Treatment
Waste processing models assume that steel and zinc are fully sorted and recycled. Any rubber or plastic packaging is incinerated at AVI facilities with energy recovery. Specific emission factors applied include plastics (0264-avC&Verbranden kunststoffen), steel (0315-reC&Sorteren en persen oud ijzer), and rubber (0260-avC&Verbranden rubber/EPDM).

Module C4 – Final Disposal
For final disposal, 5% of steel and zinc is directed to landfill, while rubber and plastics are fully incinerated. Landfill datasets include steel (0253-sto&Stort staal) and zinc (0248-sto&Stort koper, lood, verzinkt staal, zink), ensuring accurate modeling of residual waste flows.

Module D – Benefits Beyond the System Boundary
Environmental credits are accounted for recycling and energy recovery. Recycled steel is credited with a 52% substitution efficiency, calculated from 95% recycling and 43% secondary material content. Zinc benefits are modeled at 95% recycling efficiency. Incinerated rubber and plastics contribute a 100% energy substitution credit, reflecting recovered thermal and electrical energy from AVI facilities.

The overall end-of-life modeling conforms to EN 15804+A2:2019 + AC:2021 and the Dutch Bepalingsmethode v1.2 (2025), aligning with European and national standards for life cycle assessment of construction products.

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.