Environmental Product Declaration

According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:

Walraven Heavy Duty Clamp Stainless M12 DN150 6" 159-169mm

Provided by:

J. van Walraven Holding B.V.

MRPI® registration:

1.1.00957.2025

Program operator:

Stichting MRPI®

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MRPI® REGISTRATION

1.1.00957.2025

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 Heavy Duty Clamp Stainless M12 DN150 6" 159-169mm

DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

DESCRIPTION OF PRODUCT

Heavy-duty two-part clamp with locking bolts and CO_2 welded connection nut. Made from stainless steel (AISI 316 / 1.4401) for high corrosion resistance and durability 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 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 Heavy Duty Clamp Stainless M12 DN150 6" (159–169 mm) is a high-performance, two-screw stainless steel pipe clamp for large-diameter piping systems in mechanical, industrial, and infrastructure installations. It is manufactured from premium-grade stainless steel 1.4401 (AISI 316) and features a CO_2 welded connection nut. The unlined clamp provides robust support, making it suitable for high-load or corrosive environments.

Manufacturing Location
Produced at Walraven's certified facility in the Cista, Czech Republic.

Manufacturing Process Overview
The clamp body consists of stainless steel AISI 316 / 1.4401. It includes two locking bolts with anti-loss washers and a welded connection nut. The surface is naturally corrosion-resistant, requiring no additional coating. The product is fully pre-assembled at the factory to reduce on-site installation time.

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 offers long-term corrosion resistance suitable for indoor, outdoor, and chemically exposed environments. Approximately 50.2% of the stainless steel is recycled. The product is free from volatile organic compounds (VOC-free) and Substances of Very High Concern (SVHC-free). Its lifecycle assessment (LCA) covers cradle-to-grave stages (A1–A5, B1, C1–C4, D) and is modeled using Ecochain Helix v4.3.1 with Ecoinvent v3.6. The reference service life (RSL) is 50 years.

Installation and Use Phase
The pre-assembled clamp reduces labor time on-site. It is designed for non-acoustic large-diameter pipe support applications in HVAC, fire protection, and industrial piping. The product is safe for indoor technical spaces with no VOC emissions. The necessary internal transport of Czech Republic to Netherlands has been accounted in the production process of A1-A3.

End-of-Life Considerations
The fully metallic clamp can be manually disassembled for material recovery. Stainless steel components are over 95% recyclable. Module D credits are applied for recycling, which reduces the net environmental burden. Waste transport to recycling facilities is assumed at 50–100 km.

Packaging and Transport
Packaging consists of compact, recyclable cardboard cartons. Transport is modeled with 16–32 ton EURO 5/6 trucks at 50% load utilization in accordance with EN 15804 guidelines.

Compliance and Certifications
The clamp conforms to stainless steel standards AISI 316 / EN 10088 (1.4401) and meets EN 15804 + A2, ISO 14025, ISO 14040/44 lifecycle assessment requirements. Corrosion resistance is validated without additional coating. The LCA was conducted using Ecochain Helix v4.3.1.

Name - Half parts	
Steel - HD clamp	

Total Weight	1014 g

Component (> 1%)	(kg / %)
Steel (combined)	97,08%

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.

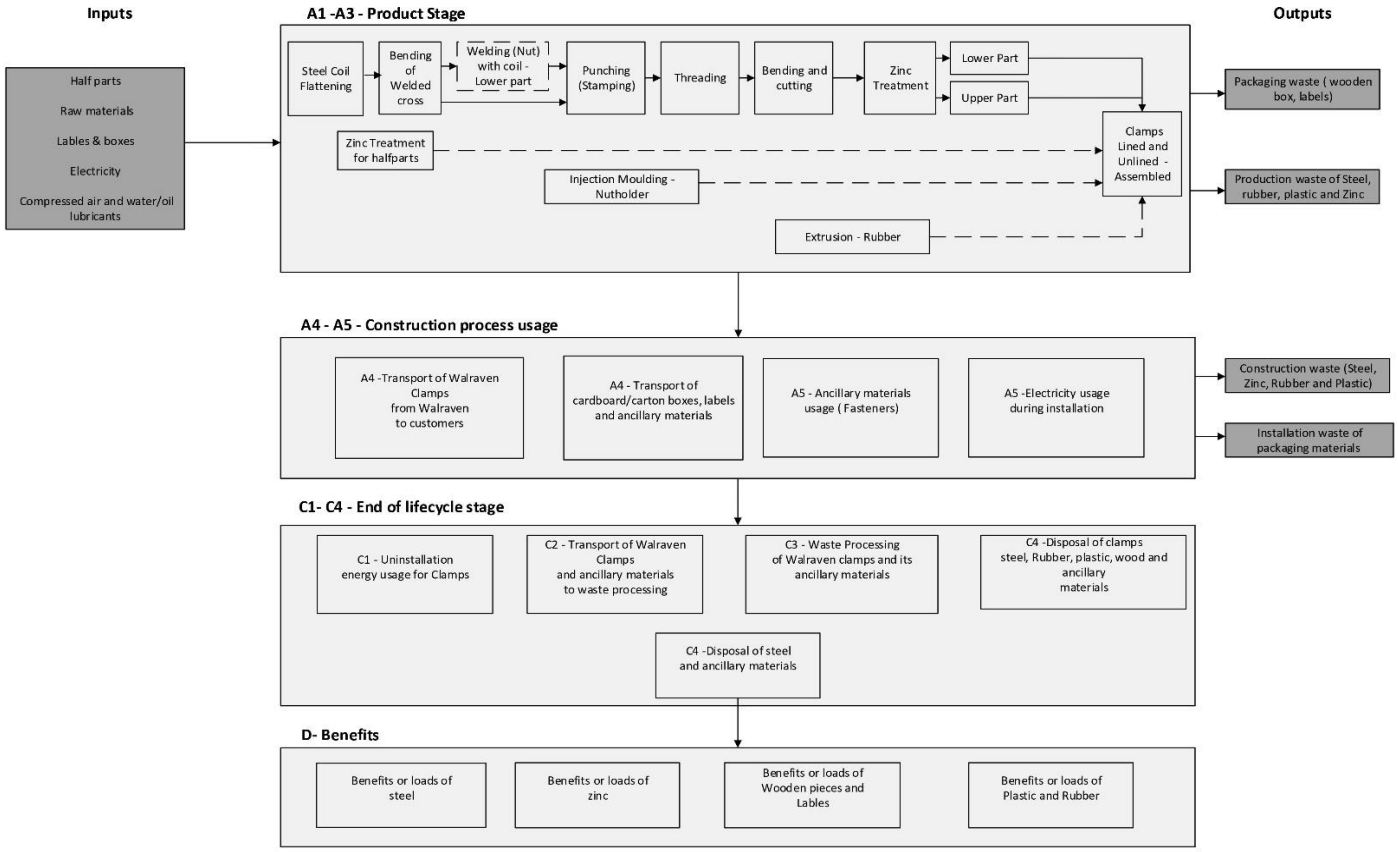
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental 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



REPRESENTATIVENESS

The aggregation was done by choosing the reference product as Walraven Heavy Duty Clamp Stainless M12 DN150 6" 159-169mm. 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 HD500 Clamp black M8/10 22-26mm
Walraven Split Band Clip (hdg) Type A 610 (603 - 610 m
Walraven Split Band Clip (untreated) Type A 610 (603 - 610 mm)
Walraven Split Band Clip DIN 3567 (hdg) Type A 508 (50
Walraven Split Band Clip DIN 3567 (untreated) Type A 508 (501 - 508 mm
Walraven Heavy Duty Clamp Stainless M12 139-149mm
Walraven Split Band Clip DIN 3567 (hdg) Type A 407 (40
Walraven HD500 Clamp BUP VdS DN65 M10/12 2 1/2"
Walraven Split Band Clip DIN 3567 (untreated) Type A 407 (400 - 407 mm
Walraven Heavy Duty Clamp Stainless M12 DN125 5" 132-140mm
Walraven HD500 Clamp BUP VdS DN50 M8/10 2"
Walraven Heavy Duty Clamp Stainless M12 125-133mm
Walraven HD500 Clamp black M8/10 12-16mm

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.	3,44E-02	3,94E-06	7,67E-06	3,44E-02	5,20E-07	1,72E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,67E-07	1,31E-06	2,31E-09	-4,80E-07
ADPF	MJ	5,81E+01	2,36E+00	8,75E+00	8,59E+04	3,11E-01	3,10E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,19E-01	3,20E-01	7,02E-03	-8,50E+00
GWP	kg CO2 eq.	3,92E+00	1,54E-01	6,66E-01	4,74E+00	2,04E-02	2,08E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,39E-02	2,34E-02	2,48E-04	-6,63E-01
ODP	kg CFC11 eq.	3,29E-07	2,74E-08	3,79E-08	3,94E-07	3,61E-09	1,92E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,02E-09	2,93E-09	8,25E-11	-2,31E-08
POCP	kg ethene eq.	3,33E-03	9,32E-05	-3,97E-04	3,02E-03	1,23E-05	8,19E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,05E-05	2,06E-05	2,64E-07	-1,44E-03
AP	kg SO2 eq.	2,14E-02	6,79E-04	2,26E-03	2,44E-02	8,95E-05	1,13E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,49E-04	2,30E-04	1,81E-06	-2,24E-03
EP	kg (PO4) 3 eq.	3,05E-03	1,33E-04	5,05E-04	3,68E-03	1,76E-05	1,75E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,93E-05	2,93E-05	3,50E-07	-2,66E-04

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	6,85E+00	6,50E-02	-9,52E-02	6,82E+00	8,57E-03	3,23E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,43E-02	2,84E-02	1,12E-04	-4,14E-01
FAETP	kg DCB eq.	1,10E-01	1,90E-03	3,32E-03	1,15E-01	2,50E-04	6,07E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,17E-04	5,28E-04	2,66E-06	5,14E-03
MAETP	kg DCB eq.	2,20E+02	6,83E+00	1,77E+01	2,44E+02	9,00E-01	1,27E+01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,50E+00	2,30E+00	9,50E-03	4,29E+00
TETP	kg DCB eq.	4,39E-02	2,30E-04	3,46E-03	4,76E-02	3,03E-05	4,12E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,05E-05	8,83E-05	2,81E-07	3,46E-02
ECI	euro	9,70E-01	1,86E-02	4,02E-02	1,03E+00	2,45E-03	4,79E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,09E-03	5,22E-03	3,50E-05	-8,26E-02
ADPF	kg Sb eq.	2,80E-02	1,14E-03	4,21E-03	4,13E+01	1,50E-04	1,49E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,49E-04	1,54E-04	3,38E-06	-4,09E-03

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.	4,03E+00	1,56E-01	6,54E-01	4,84E+00	2,05E-02	2,10E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,42E-02	3,79E-03	2,53E-04	-7,10E-01
GWP-fossil	kg CO2 eq.	4,00E+00	1,56E-01	6,52E-01	4,81E+00	2,05E-02	2,09E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,42E-02	2,37E-02	2,52E-04	-7,10E-01
GWP-biogenic	kg CO2 eq.	1,76E-02	5,81E-05	1,27E-03	1,89E-02	7,66E-06	9,98E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,28E-05	-1,99E-02	1,48E-07	0,00E+00
GWP-luluc	kg CO2 eq.	7,27E-03	5,71E-05	7,95E-04	8,12E-03	7,52E-06	4,35E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,25E-05	2,65E-05	7,04E-08	5,25E-04
ODP	kg CFC11 eq.	3,31E-07	3,44E-08	2,87E-08	3,94E-07	4,53E-09	1,96E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,55E-09	3,40E-09	1,04E-10	-1,73E-08
AP	mol H+ eq.	2,63E-02	9,03E-04	2,68E-03	2,99E-02	1,19E-04	1,39E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,98E-04	2,87E-04	2,40E-06	-2,74E-03
EP-fresh water	kg PO4 eq.	3,14E-04	1,57E-06	1,23E-04	4,38E-04	2,07E-07	2,08E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,45E-07	1,61E-06	2,83E-09	-2,51E-05
EP-marine	kg N eq.	5,35E-03	3,18E-04	3,52E-04	6,02E-03	4,19E-05	2,84E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,99E-05	6,33E-05	8,24E-07	-5,08E-04
EP-terrestrial	mol N eq.	5,96E-02	3,51E-03	4,38E-03	6,75E-02	4,63E-04	3,18E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,71E-04	7,34E-04	9,09E-06	-5,93E-03
POCP	kg NMVOC eq.	1,87E-02	1,00E-03	1,59E-04	1,99E-02	1,32E-04	8,20E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,20E-04	2,01E-04	2,64E-06	-4,04E-03
ADP-minerals & metals	kg Sb eq.	3,44E-02	3,94E-06	7,67E-06	3,44E-02	5,20E-07	1,72E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,67E-07	1,31E-06	2,31E-09	-4,80E-07
ADP-fossil	MJ, net calorific value	5,61E+01	2,35E+00	1,01E+01	6,86E+01	3,10E-01	3,24E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,16E-01	3,28E-01	7,06E-03	-4,96E+00
WDP	m3 world eq. Deprived	2,10E+00	8,40E-03	1,82E-01	2,29E+00	1,11E-03	1,08E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,85E-03	3,30E-03	3,16E-04	-1,35E-01

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	2,31E-07	1,40E-08	-2,06E-08	2,25E-07	1,84E-09	9,61E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,07E-09	3,60E-09	4,65E-11	-4,11E-08
IRP	kBq U235 eq.	3,02E-01	9,84E-03	6,32E-02	3,75E-01	1,30E-03	1,96E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,16E-03	1,63E-03	2,90E-05	1,21E-02
ETP-fw	CTUe	3,93E+02	2,09E+00	-2,66E+00	3,93E+02	2,76E-01	1,86E+01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,60E-01	1,41E+00	4,58E-03	-2,38E+01
HTP-c	CTUh	2,31E-08	6,79E-11	-1,60E-09	2,16E-08	8,96E-12	1,08E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,49E-11	3,44E-11	1,06E-13	-9,09E-11
HTP-nc	CTUh	4,12E-07	2,29E-09	-2,96E-09	4,11E-07	3,02E-10	2,75E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,03E-10	1,63E-09	3,26E-12	1,38E-07
SQP	-	1,99E+01	2,04E+00	2,76E+00	2,47E+01	2,68E-01	1,25E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,47E-01	6,60E-01	1,48E-02	-1,10E+00

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	4,48E-03	5,95E-06	-2,45E-05	4,47E-03	7,85E-07	2,19E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,31E-06	9,89E-07	1,05E-08	-8,52E-05
NHWD	kg	9,70E-01	1,49E-01	5,43E-02	1,17E+00	1,96E-02	6,07E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,27E-02	9,59E-03	4,79E-02	-6,95E-02
RWD	kg	2,51E-04	1,54E-05	5,24E-05	3,19E-04	2,03E-06	1,65E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,39E-06	1,94E-06	4,64E-08	4,20E-06
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	4,32E-04	4,32E-04	0,00E+00	2,16E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	9,11E-01	0,00E+00	0,00E+00
MER	kg	0,00E+00	0,00E+00	2,62E-05	2,62E-05	0,00E+00	1,31E-06	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	1,51E-03	1,51E-03	0,00E+00	7,55E-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	8,78E-04	8,78E-04	0,00E+00	4,39E-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	6,59E+00	2,94E-02	1,21E+00	7,83E+00	3,88E-03	4,02E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,46E-03	5,15E-02	5,71E-05	1,44E-01
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	6,59E+00	2,94E-02	1,21E+00	7,83E+00	3,88E-03	4,02E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,46E-03	5,15E-02	5,71E-05	1,44E-01
PENRE	MJ	5,97E+01	2,49E+00	1,09E+01	7,30E+01	3,29E-01	3,46E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,48E-01	3,48E-01	7,50E-03	-5,15E+00
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	5,97E+01	2,49E+00	1,09E+01	7,30E+01	3,29E-01	3,46E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,48E-01	3,48E-01	7,50E-03	-5,15E+00
SM	kg	4,12E-01	0,00E+00	1,26E-04	4,12E-01	0,00E+00	6,31E-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	6,93E-02	2,86E-04	2,10E-02	9,06E-02	3,77E-05	4,42E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,28E-05	1,56E-04	7,54E-06	-2,57E-03

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 the Walraven Heavy Duty Clamp Stainless M12 DN150 6" (159–169 mm) have been modeled to reflect actual production as accurately as possible. The assessment prioritizes primary data collected at Walraven's Czech Republic facility. Where primary data was unavailable, verified secondary data from recognized databases was used.

For Module A1, specific product composition data for the HD Clamp Stainless M12 and zinc was obtained directly from Walraven's internal records. Module A2 incorporates actual transport distances and methods for raw materials delivered to the production site. Module A3 includes site-specific data on energy consumption, material use, and waste generation during the production period of 2023/2024. Background processes were sourced from the Nationale Milieudatabase v3.8 and Ecoinvent v3.6 for any missing supplier-specific data.

The dataset represents production processes used in 2023/2024. The LCA was prepared in accordance with EN 15804+A2:2019, ISO 14040, ISO 14044, ISO 14025, and the NMD Bepalingsmethode v1.2 (2025), with calculations conducted using Ecochain Helix version 4.3.1. The assessment covers the full life cycle stages, including raw material supply, transport, and manufacturing (A1–A3), transport to site and installation (A4–A5), end-of-life processes including deconstruction, transport, processing, and disposal (C1–C4), and potential benefits from reuse, recycling, or recovery (D).

System boundaries follow the modular structure of EN 15804, and all relevant flows of materials, energy, auxiliary substances, and emissions were included. Manufacturing inputs were allocated using mass-based allocation, with cut-off criteria applied so that excluded flows do not exceed 5% of mass or energy per module. Primary data collected at the production site included material composition, energy consumption, waste generation, and transport distances such as for steel delivery and to the zinc plating facility. For processes lacking site-specific data, generic datasets from Ecoinvent 3.6 and Nationale Milieudatabase v3.8 were applied, including references for stainless steel production, zinc treatment, transportation, and auxiliary inputs.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Modules A1 to A3 encompass the life cycle stages from raw material sourcing to factory gate. Module A1 includes the extraction and processing of raw and auxiliary materials used in the production of the clamp. The main components include stainless steel and a zinc coating, modeled using data from the 2023/2024 production year. These inputs were mapped using background datasets from the Nationale Milieudatabase (NMD) v3.8 and Ecoinvent v3.6. For steel, a representative market mix of 49.8% primary and 50.2% secondary content was used. The clamp's total weight includes stainless steel and a small proportion of zinc for corrosion protection.

Module A2 covers inbound transportation to the Walraven Czech Republic manufacturing facility. Transport distances were modeled with standard values following EN 15804+A2, using an average 50% load factor (full inbound, empty outbound). The key inputs were transported approximately 600 km by truck and 100 km for zinc treatment, based on process mapping in the LCA.

Module A3 models the production phase, using specific operational data from 2023/2024. This includes electricity consumption (grid mix), lubricating oil use, and emissions from welding. Steel scrap generated during the manufacturing process is partly recycled, and zinc treatment also contributes to energy consumption. Waste and emissions were tracked for all production-related processes, and no significant hazardous waste streams were reported. Capital goods are excluded per EN 15804+A2's 5% cutoff rule.

Module A4 addresses the distribution phase. Transport from the production facility to the customer is modeled based on standard assumptions, using a 150 km one-way transport distance with unspecified freight lorry data from the NMD database. A 50% load factor is used in emission calculations.

Module A5 includes installation considerations, applying a default 5% product loss due to manual installation inefficiencies. Packaging waste is also considered in this phase. No energy consumption is included as installation is manual. Material losses (steel and zinc) are assumed to be transported 100 km to appropriate waste processors, modeled with standard ton-kilometer calculations.

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 assumes manual deconstruction of the clamp with no associated energy consumption.

Module C2 models transportation of materials after deconstruction: steel and zinc are transported 50 km to recycling or landfill. No rubber or plastic is present in this product, so no transport to incineration is required.

Module C3 accounts for waste processing. Steel and zinc are fully sorted and recycled, using emission factors from validated NMD processes (steel: 0315-reC&Sorteren en persen oud ijzer; zinc: modeled via NMD references for coated steel/zinc).

Module C4 models final disposal of the small fraction of materials that are not recycled: 5% of steel and zinc are sent to landfill (steel: 0253-sto&Stort staal; zinc: 0248-sto&Stort koper, lood, verzinkt staal, zink).

Module D quantifies environmental benefits beyond the system boundary. Recycled steel is credited with a 45.2 % substitution efficiency (based on 95 % recycling minus 49.8 % secondary content). Zinc is credited with 95 % recycling efficiency. No incineration-based energy recovery is applied, as there are no plastic or rubber components.

All modeling follows EN 15804+A2:2019 + AC:2021 and the Dutch Bepalingsmethode v1.2 (2025), ensuring compliance with national and European LCA standards.

DECLARATION OF SVHC

No substances that are listed in the latest “Candidate List of Substances of Very High Concern for authorisation” are included in the product that exceeds the limit for registration

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