Environmental Product Declaration

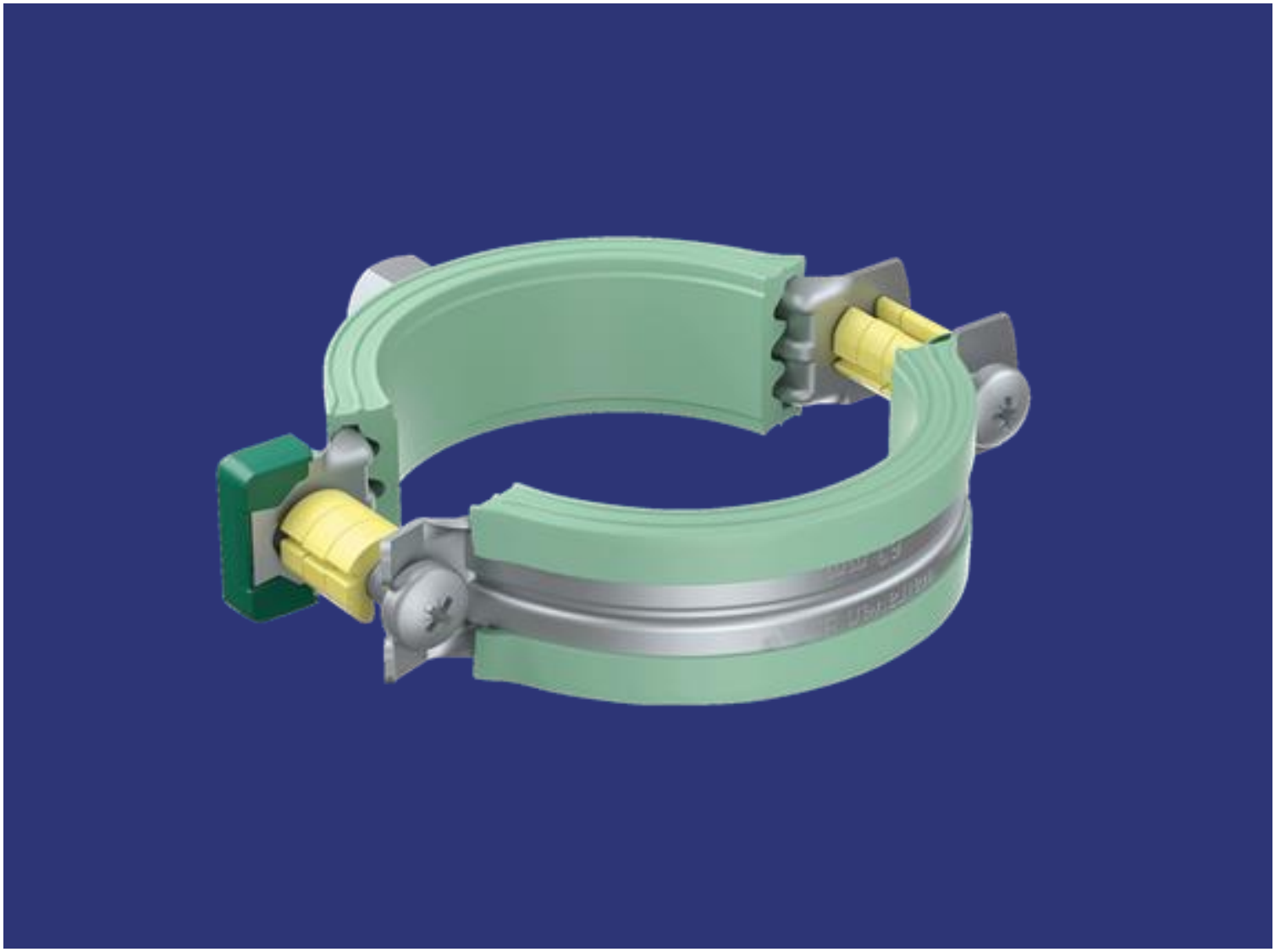
According to ISO14025+EN15804 A2 (+indicators A1)

This declaration is for:

Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 78mm

Provided by:

J. van Walraven Holding B.V.



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MRPI® REGISTRATION

1.1.00939.2025

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 Bifix® 5000 Clamp G2 BUP EPDM green M8/10 78mm

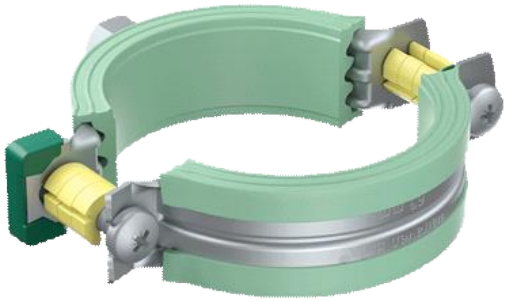
DECLARED UNIT / FUNCTIONAL UNIT

1 Piece

DESCRIPTION OF PRODUCT

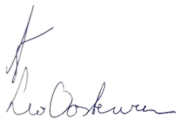
The Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 78mm is a two-screw pipe clamp designed for secure indoor and outdoor pipe support. It features a quick locking system, removable spacer washers, and a green EPDM lining for acoustic insulation per DIN 4109. Made of corrosion-resistant steel, it is part of the Walraven BIS UltraProtect® 1000 system and withstands 1,000 hours of salt spray per ISO 9227.

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 Bifix® 5000 Clamp G2 BUP EPDM green M8/10 78mm is a durable two-screw clamp designed for plastic pipes (Ø 78 mm) in both indoor and outdoor environments. Manufactured in the Mijdrecht, Netherlands, it features a quick locking system, removable spacer washers, and a sound-insulating EPDM lining compliant with DIN 4109. The BUP 1000 surface ensures excellent corrosion protection for long-term performance.

Manufacturing Process:
Steel Coil Processing: Steel is flattened and cut for the clamp body, ensuring structural integrity and strength.
Stamping & Bending: The upper and lower parts of the clamp are precisely formed for a secure fit.
Threading & Welding: A resistance-welded connecting nut is attached for strong and reliable mounting performance.
Surface Treatment: The clamp is treated with a zinc coating that provides long-lasting corrosion protection in accordance with ISO 9227.
Final Assembly: The product includes pre-installed locking screws, nuts, anti-loss washer (POM), and nut holder (PP), enabling quick and secure 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+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: Zinc coating ensures high corrosion resistance, removing the need for additional surface treatments.

Sustainability Compliance: The product is covered by an Environmental Product Declaration (EPD) aligned with EN 15804+A2:2019 and ISO 14025.

Packaging and Transport:
Packaging: Supplied in recyclable cardboard boxes with clear labeling for easy handling and logistics.

Installation Readiness: Fully assembled and prepared for direct use on-site.

Name - Half parts	
Steel - Lower part	
Steel - Upper part	
Steel - Hollow pan head screw	
Steel - Nut	
Plastic - Nut holder	
Plastic - Anti-loss washer	
Rubber - EPDM	

Total Weight	157g

Component (> 1%)	(%)
Steel (combined)	86,33%
Rubber - EPDM	8,27%

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 BISMAT/Bifix 5000 Clamps , which confirms a minimum working life of 50 years under appropriate usage and maintenance conditions.

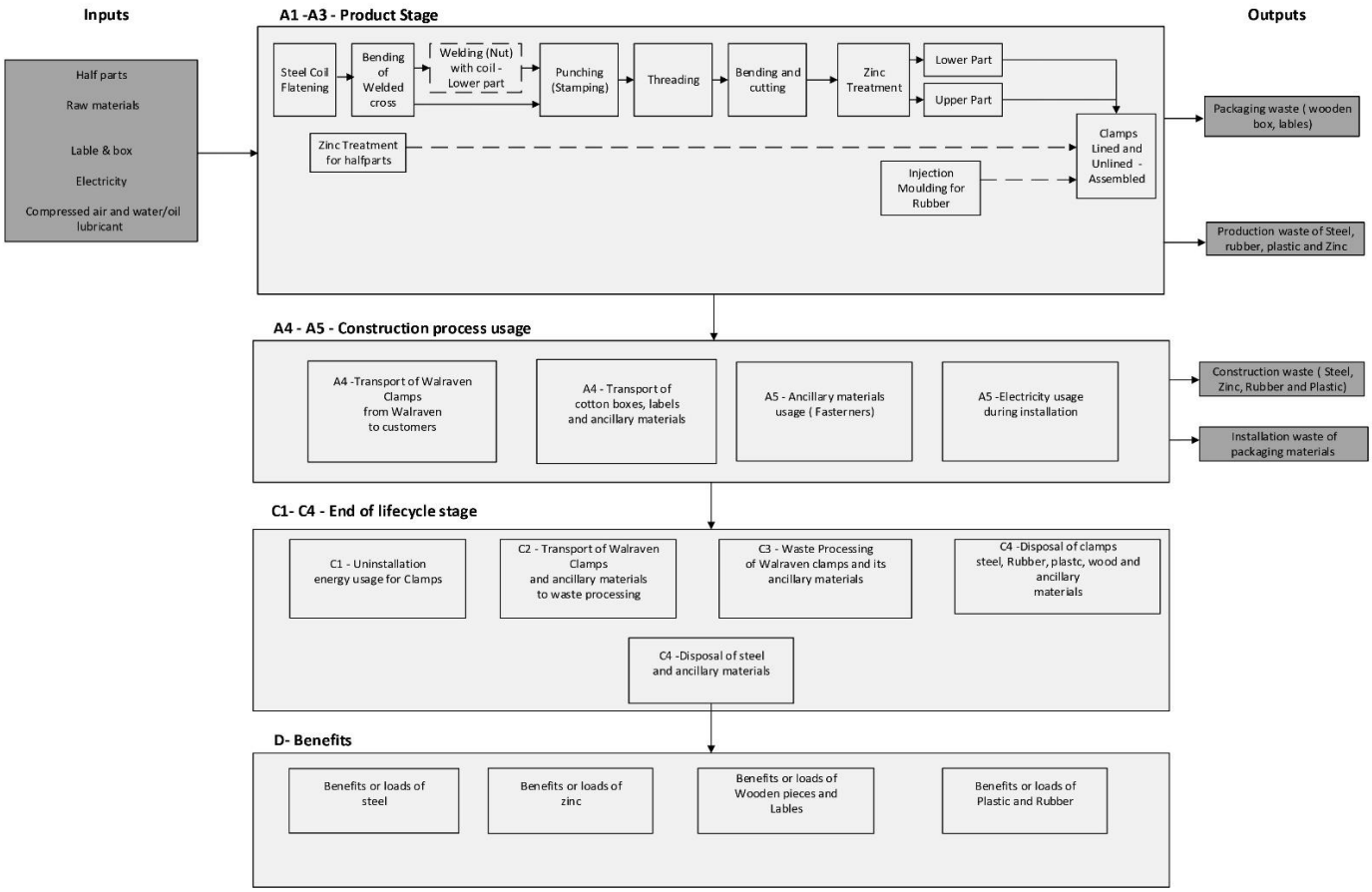
All significant inputs and outputs such as emissions, energy consumption, and material flows are accounted for. Materials representing less than 1% of the product's total weight may be excluded unless they are expected to contribute more than 5% to any environmental impact category. The cumulative environmental 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
Lable & box
Electricity
Compressed air and water/oil lubricant
Steel Coil Flatening
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 for Rubber
Clamps Lined and Unlined - Assembled
Packaging waste (wooden box, lables)
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 cotton boxes, labels and ancillary materials
A5 - Ancillary materials usage (Fasterners)
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, plastc, 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 the Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 78mm. 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 Bifix® 5000 Clamp G2 BUP EPDM green M8/10 50mm
Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 56mm
Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 58mm
Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 63mm
Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 75mm
Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 78mm
Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 90mm
Walraven Duplo pre-galvanized EPDM black 1"
Walraven Double Wall Clamp pre-galvanized EPDM Pin 120 1"
Walraven KSB2 Clamp zinc plated EPDM M8/10/1/2" 48-52mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 54-58mm
Walraven KSB2 Clamp zinc plated EPDM M8/10/1/2" 54-58mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 60-64mm
Walraven KSB2 Clamp zinc plated EPDM M8/10/1/2" 60-64mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 66-70mm
Walraven KSB2 Clamp zinc plated EPDM M8/10/1/2" 66-70mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 75-79mm
Walraven KSB2 Clamp zinc plated EPDM M8/10/1/2" 75-79mm
Walraven KSB2 Clamp zinc plated EPDM M8/10 80-83mm
Walraven KSB2 Clamp zinc plated EPDM M8/10/1/2" 80-83mm
Walraven Bifix® G2 Clamp BUP M8/10 88-91mm

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.	4,16E-03	2,20E-06	4,28E-07	4,16E-03	8,05E-08	1,95E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,88E-07	1,65E-07	2,93E-10	-2,60E-04
ADPF	MJ	6,85E+00	1,32E+00	4,29E-01	1,27E+04	4,82E-02	3,62E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,12E-01	4,37E-02	8,88E-04	-1,56E+00
GWP	kg CO2 eq.	4,45E-01	8,65E-02	2,34E-02	5,55E-01	3,15E-03	2,45E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,35E-03	2,73E-02	3,15E-05	-1,02E-01
ODP	kg CFC11 eq.	3,41E-08	1,53E-08	2,27E-09	5,17E-08	5,59E-10	2,39E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,30E-09	4,61E-10	1,04E-11	-6,18E-09
POCP	kg ethene eq.	4,13E-04	5,25E-05	2,07E-07	4,66E-04	1,90E-06	1,40E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,44E-06	2,67E-06	3,34E-08	-1,94E-04
AP	kg SO2 eq.	2,52E-03	3,89E-04	3,97E-05	2,95E-03	1,39E-05	1,31E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,23E-05	3,09E-05	2,29E-07	-4,09E-04
EP	kg (PO4) 3 eq.	3,60E-04	7,55E-05	7,09E-06	4,43E-04	2,72E-06	2,03E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,35E-06	4,42E-06	4,44E-08	-5,06E-05

Toxicity indicators and ECI (Dutch market)

HTP	kg DCB eq.	8,38E-01	3,65E-02	2,16E-03	8,77E-01	1,33E-03	4,11E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,10E-03	3,66E-03	1,49E-05	-6,33E-02
FAETP	kg DCB eq.	1,39E-02	1,06E-03	8,59E-05	1,50E-02	3,87E-05	7,57E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,04E-05	7,59E-05	7,48E-07	-9,22E-05
MAETP	kg DCB eq.	2,65E+01	3,83E+00	3,41E-01	3,06E+01	1,39E-01	1,52E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,25E-01	3,10E-01	1,26E-03	-9,05E-01
TETP	kg DCB eq.	5,07E-03	1,29E-04	1,82E-04	5,38E-03	4,69E-06	4,77E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,09E-05	1,23E-05	3,74E-08	4,12E-03
ECI	euro	1,16E-01	1,05E-02	1,67E-03	1,29E-01	3,80E-04	5,92E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,86E-04	1,90E-03	4,52E-06	-1,33E-02
ADPF	kg Sb eq.	3,29E-03	6,36E-04	2,06E-04	6,12E+00	2,32E-05	1,74E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,41E-05	2,10E-05	4,27E-07	-7,52E-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.	4,58E-01	8,73E-02	2,34E-02	5,69E-01	3,18E-03	2,49E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,42E-03	2,53E-02	3,21E-05	-1,08E-01
GWP-fossil	kg CO2 eq.	4,55E-01	8,73E-02	2,34E-02	5,66E-01	3,18E-03	2,48E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,42E-03	2,74E-02	3,21E-05	-1,08E-01
GWP-biogenic	kg CO2 eq.	1,93E-03	3,25E-05	-5,00E-07	1,96E-03	1,19E-06	9,85E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,77E-06	-2,06E-03	1,99E-08	0,00E+00
GWP-luluc	kg CO2 eq.	8,83E-04	3,21E-05	-5,55E-07	9,14E-04	1,16E-06	4,71E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,72E-06	3,46E-06	8,95E-09	2,10E-05
ODP	kg CFC11 eq.	3,54E-08	1,93E-08	2,47E-09	5,71E-08	7,01E-10	2,70E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,64E-09	5,22E-10	1,31E-11	-6,01E-09
AP	mol H+ eq.	3,10E-03	5,17E-04	5,35E-05	3,67E-03	1,84E-05	1,64E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,30E-05	3,89E-05	3,03E-07	-5,00E-04
EP-fresh water	kg PO4 eq.	3,51E-05	8,78E-07	4,55E-07	3,64E-05	3,21E-08	1,60E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,48E-08	2,06E-07	3,62E-10	-4,65E-06
EP-marine	kg N eq.	6,51E-04	1,81E-04	1,09E-05	8,42E-04	6,50E-06	3,90E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,52E-05	9,13E-06	1,05E-07	-9,31E-05
EP-terrestrial	mol N eq.	7,20E-03	1,99E-03	1,65E-04	9,36E-03	7,16E-05	4,31E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,67E-04	1,05E-04	1,15E-06	-1,08E-03
POCP	kg NMVOC eq.	2,35E-03	5,68E-04	2,68E-05	2,94E-03	2,04E-05	1,22E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,77E-05	2,83E-05	3,35E-07	-6,06E-04
ADP-minerals & metals	kg Sb eq.	4,16E-03	2,20E-06	4,28E-07	4,16E-03	8,05E-08	1,95E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,88E-07	1,65E-07	2,93E-10	-2,60E-04
ADP-fossil	MJ, net calorific value	6,23E+00	1,32E+00	3,98E-01	7,94E+00	4,79E-02	3,50E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,12E-01	4,42E-02	8,95E-04	-1,15E+00
WDP	m3 world eq. Deprived	2,89E-01	4,69E-03	5,38E-03	2,99E-01	1,71E-04	1,32E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,00E-04	7,65E-04	3,85E-05	-3,58E-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	3,05E-08	7,81E-09	8,22E-11	3,84E-08	2,85E-10	1,68E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,66E-10	4,58E-10	5,90E-12	-6,17E-09
IRP	kBq U235 eq.	2,85E-02	5,51E-03	6,61E-04	3,47E-02	2,01E-04	1,73E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,69E-04	2,12E-04	3,71E-06	-9,24E-04
ETP-fw	CTUe	4,80E+01	1,17E+00	2,13E-01	4,94E+01	4,27E-02	2,22E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,97E-02	2,33E-01	7,55E-04	-5,43E+00
HTP-c	CTUh	2,93E-09	3,81E-11	-1,12E-11	2,95E-09	1,39E-12	1,44E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,24E-12	4,77E-12	1,47E-14	-7,42E-11
HTP-nc	CTUh	5,01E-08	1,28E-09	1,58E-10	5,15E-08	4,67E-11	3,34E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,09E-10	2,21E-10	5,51E-13	1,48E-08
SQP	-	2,34E+00	1,14E+00	5,03E-01	3,98E+00	4,16E-02	1,96E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,70E-02	8,15E-02	1,89E-03	-2,83E-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	5,42E-04	3,33E-06	1,56E-06	5,47E-04	1,21E-07	2,52E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,83E-07	1,41E-07	1,33E-09	-4,35E-05
NHWD	kg	1,25E-01	8,31E-02	7,55E-04	2,08E-01	3,04E-03	1,08E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,09E-03	1,72E-03	5,97E-03	-1,08E-02
RWD	kg	2,35E-05	8,64E-06	6,30E-07	3,28E-05	3,15E-07	1,61E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	7,34E-07	2,50E-07	5,88E-09	-1,93E-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	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	1,10E-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	7,89E-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	6,58E-02
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	3,82E-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	6,42E-01	1,64E-02	1,58E-01	8,17E-01	6,00E-04	4,03E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,40E-03	6,53E-03	9,25E-06	-1,95E-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	6,42E-01	1,64E-02	1,58E-01	8,17E-01	6,00E-04	4,03E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,40E-03	6,53E-03	9,25E-06	-1,95E-02
PENRE	MJ	6,63E+00	1,40E+00	4,35E-01	8,46E+00	5,09E-02	3,73E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,19E-01	4,70E-02	9,51E-04	-1,21E+00
PENRM	MJ	2,12E-01	0,00E+00	0,00E+00	2,12E-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	6,84E+00	1,40E+00	4,35E-01	8,67E+00	5,09E-02	3,73E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,19E-01	4,70E-02	9,51E-04	-1,21E+00
SM	kg	4,99E-02	0,00E+00	4,58E-05	4,99E-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	8,65E-03	1,60E-04	1,77E-04	8,99E-03	5,84E-06	4,10E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,36E-05	5,07E-05	9,64E-07	-8,60E-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
The data modelling reflects the actual product configuration and manufacturing process where primary data is available.

Primary Data: Collected from Walraven's departments responsible for sourcing, planning, energy, and production.

Where component specific data is missing (e.g., internal lining, stainless steel vs. galvanized steel variations), Ecoinvent 3.6 and NMD 3.8 references were applied.

2. Data Collection Period
The dataset reflects the operational and production reality of 2023 and 2024.

3. Methodology & Reproducibility
Standards Applied: Based on EN 15804+A2 (version 1.2, 2025) and NMD Bepalingsmethode v1.2.

Group Assessment: Due to its distinct design and possible acoustic or fire resistant linings, grouping with Bifix® G2 or 4000 clamps is not automatically justifiable. This product may require a separate reference group or standalone modelling.

Reference Product Selection: If part of a range (e.g., Bifix® 5000 from 65–80 mm), you may define the 78 mm clamp as the worst-case reference or group it under a larger size (e.g., 80–90 mm), provided impact deviation is ≤20%.

4. Inventory and Allocation
System Boundaries: Modular approach, cradle-to-grave, covering raw material extraction, transport, production, installation, and end-of-life (C2–C4 + D).

Materials: Likely includes reinforced steel, premium lining materials, and acoustic inserts (if applicable). These may carry higher environmental burdens than standard clamps.

Energy Use & Emissions: Included per Walraven energy tracking; fallback to EcoInvent or NMD average steel clamp manufacturing profiles.

5. Allocation and Grouping
Worst-Case or Representative? If the 78 mm clamp is one of the largest or most material-intensive in the 5000 series, it may serve as the worst-case scenario reference for others in the product line.20% Allocation Threshold: Needs confirmation if other variants (e.g., 70 mm or 80 mm) deviate ≤20% in impact categories, grouping is permitted.

Reference Product Strategy: Use Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 78mm as the group reference, if it reflects the upper limit of environmental impact within its product series.

6. Data Sources
Primary: Walraven's materials planning, transport logistics, and production documentation.

Secondary: Public literature, technical datasheets, and standard datasets from Ecoinvent 3.6 and NMD v3.8 (for steel, elastomers, and rubber insulation materials).

Installation/Transport: Modeled per standard EN15804 transport assumptions or actual supplier delivery routes when available.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Modules A1 to A3 describe the upstream and manufacturing life cycle stages. Module A1 includes the extraction, processing, and transport of raw materials and auxiliary substances such as packaging and lubricants. For the Walraven Bifix® 5000 Clamp G2 BUP EPDM green M8/10 78mm, modeling is based on actual production data from 2023–2024. Key materials include steel (various grades), EPDM rubber for acoustic insulation, PA6 plastic, and protective zinc coatings. Dataset selection is aligned with NMD v3.8 and Ecoinvent v3.6. Where primary data was unavailable, generic datasets were used. The steel composition assumes 57% primary and 43% secondary content in line with standard NMD methodology.

Module A2 models the transport of raw materials to the Walraven production site in Mijdrecht. Transport modeling is performed in accordance with EN 15804+A2:2019/AC:2021, using datasets from NMD v3.8 and Ecoinvent v3.6, and assumes a 50% load factor, representing a full truck to the site and an empty return. Zinc coating processes are modeled over 100 km, with an additional 100 km applied for selected steel components transported to the zinc treatment facility. All road transport emissions are calculated using the dataset 0001-tra&Transport, vrachtwagen (freight, lorry, unspecified {GLO}) from NMD v3.8 and Ecoinvent v3.6.

Module A3 models the production process at Walraven Mijdrecht. This includes electricity and fuel consumption, packaging usage, and waste generation. The electricity mix includes both grid electricity and rooftop solar energy. Additional electricity was specifically allocated to the zinc coating processes.

Production waste included steel scrap, a significant portion of which was recycled. The quantities were scaled according to the Mijdrecht facility's production share. Waste transportation to recycling and disposal facilities was accounted for. Additionally, lubricating oil was used as an auxiliary production input. Capital goods were excluded from this module in line with the EN 15804+A2 cutoff rule, as their environmental impact was below the 5% significance threshold.

Module A4 covers the distribution of finished products from the Mijdrecht production site to installation locations. A standard transport distance of 150 km was assumed, based on the Bepalingsmethode v1.2 (2025). The modeling used a 50% load factor, and emissions were calculated using: 0001-tra&Transport, vrachtwagen, from NMD v3.8 / Ecoinvent v3.6.

Module A5 includes the installation phase. A 5% material loss was assumed for steel, rubber, and plastic due to manual installation inefficiencies. No energy inputs were modeled for installation, as the process is manual. Waste transportation was modeled as follows:Steel: 100 km to landfill and Rubber and plastic: 100 km to AVI (waste incineration) facilities

End-of-life fractions for installation waste were:

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 or uninstallation of the clamp at the end of its service life. No energy consumption is associated with this stage.

Module C2 models the transport of post-use materials to their respective waste 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 modeled using the dataset 0001-tra&Transport, vrachtwagen from NMD v3.8 and Ecoinvent v3.6.

Module C3 covers waste processing. Steel and zinc are assumed to be fully recycled after sorting, whereas rubber and plastic are completely incinerated with energy recovery at AVI facilities. Emissions are modeled using the following references: 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 addresses final disposal. A residual 5% of steel and zinc is assumed to be landfilled, using 0253-sto&Stort staal for steel and 0248-sto&Stort koper, lood, verzinkt staal, zink for zinc.

Module D quantifies environmental benefits beyond the system boundary. Steel recycling is credited with a 52% substitution benefit, reflecting a 95% recycling rate minus 43% secondary content. Zinc recycling is modeled at 95% efficiency. Plastics and rubber incinerated at AVI plants are credited with a 100% energy substitution benefit, representing recovered energy displacing fossil-based electricity.

This life cycle assessment is prepared in accordance with EN 15804:2012+A2:2019/AC:2021 and follows the modular approach of Bepalingsmethode v1.2 (2025). All data are derived from verified sources, including NMD v3.8 and Ecoinvent v3.6, in line with current Dutch and international standards for construction product environmental declarations.

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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