

ENVIRONMENTAL
PRODUCT DECLARATION
NO. 01-10/2025

Mechanical anchor
R-HPTIII-ZP

OWNER OF THE
DECLARATION:

PROGRAMM OWNER:

PROGRAM NAME:

DATA OF ISSUE:

DECLARATION VALID UNTIL: **01.10.2030**

Rawlplug S.A.

Łukasiewicz Research Network – Institute of Ceramics
and Building Materials

Environmental product declaration

01.10.2025



1. GENERAL INFORMATION

Product of declaration:	Mechanical anchor R-HPT-III-ZP
Program owner: Łukasiewicz Research Network– Institute of Ceramics and Building Materials Environmental Engineering Center in Opole. http://www.icimb.pl/opole/	Declaration owner: Rawlplug S.A. 6 Kwidzyńska str, 51-416 Wrocław Telephone: +48 695 223 116 Adress: info@rawlplug.com www.rawlplug.com
Declared unit:	1 kg
Date of issue:	01.10.2025
Declaration valid until:	01.10.2030
Life Cycle Analysis (LCA):	A1-A3, C1-C4 and D according to PN-EN 15804+A2 (Cradle-to-Gate with options)
Product Categorization (PCR) Rules	PN-EN 15804+A2:2020-03 Sustainability of construction works. Environmental Product Declarations. Basic principles of categorization of construction products, ICIMB-PCR A.
Representatives:	Polish product, year 2024
Declared durability:	50 years
Reasons for performing LCA:	B2B
Standard of product	EAD 331232-01-0601
Declarations that are the result of different programs or are not performed in accordance with the standard may not be comparable.	
The Łukasiewicz – Institute of Ceramics and Building Materials Environmental Engineering Center provides access to the Type III environmental declaration for mechanical anchor R-HPT-III - ZP to interested parties.	
The declaration owner is responsible for the information and the base evidence. Łukasiewicz Research Network - Institute of Ceramics and Building Materials Center for Environmental Engineering is not responsible for the manufacturer's information and data and evidence regarding the life cycle assessment.	
Authors' team: Katarzyna Kiprian, M.Sc. Ewa Głodek-Bucyk, Ph.D. Patryk Okoń, M.Sc. Approved:  Joanna Poluszyńska, PhD Director of the Environmental Engineering Center  Ewa Głodek-Bucyk, Ph.D. Leader of the Process Engineering Research Group	Review: CEN standard PN-EN 15804+A2 serves as the main PCR document. Independent verification of declarations and data according to EN ISO 14025:2010 ☐ internal ☒ external  Katarzyna Grzesik, PhD, DSc

2. INFORMATION ABOUT THE MANUFACTURER AND PRODUCTS

Rawlplug is a leading global supplier of innovative fastening systems, fasteners and tools for the construction and industrial sectors, as well as for individual customers. The company, whose history dates back over 100 years to the invention of the first expansion plug, has four modern production plants. Two in Poland (Wrocław and Łańcut) and in Vietnam and Thailand, as well as a modern Net Zero logistics centre in Koźuchów, Poland. Rawlplug consistently pursues an ambitious ESG strategy, with the overarching goal of achieving climate neutrality by 2030. Thanks to a global network of 42 sales companies, the company delivers high-quality products and services in over 100 countries. With over 2,000 employees, the Rawlplug Group supports the most demanding engineering projects in the world – from Burj Khalifa to space missions to Mars. For more information, visit: www.rawlplug.com.



Figure 1.
Production plant in Łańcut

The R-HPT-III-ZP band anchor is an advanced fastening element used in construction, designed for permanent and secure embedding of structural elements in concrete. The version marked with the symbol ZP is made of carbon steel, coated with a galvanised zinc coating, which provides effective corrosion protection in environments with moderate and high humidity levels and ensures high resistance to fire (R30-R120) and high load-bearing capacity for seismic loads C1 and C2.

The anchor is suitable for installation in both cracked and non-cracked concrete, making it a versatile solution for many construction applications, from steel installations and balustrades to façade elements and load-bearing systems.

One of the key advantages of this product is the possibility of adjusting the embedment depth, which allows for optimising the installation in terms of load-bearing capacity and material consumption.

The anchor consists of:

- bolt,
 - expansion sleeve (band),
 - washer and hexagonal nut – both of these components are sourced from an external supplier.
- The nut is zinc-coated at the factory.

All parts are assembled at the production plant to form a ready-to-use, complete product.

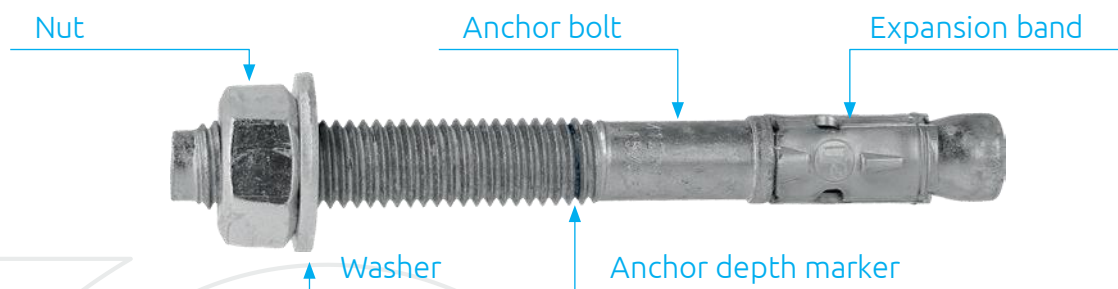
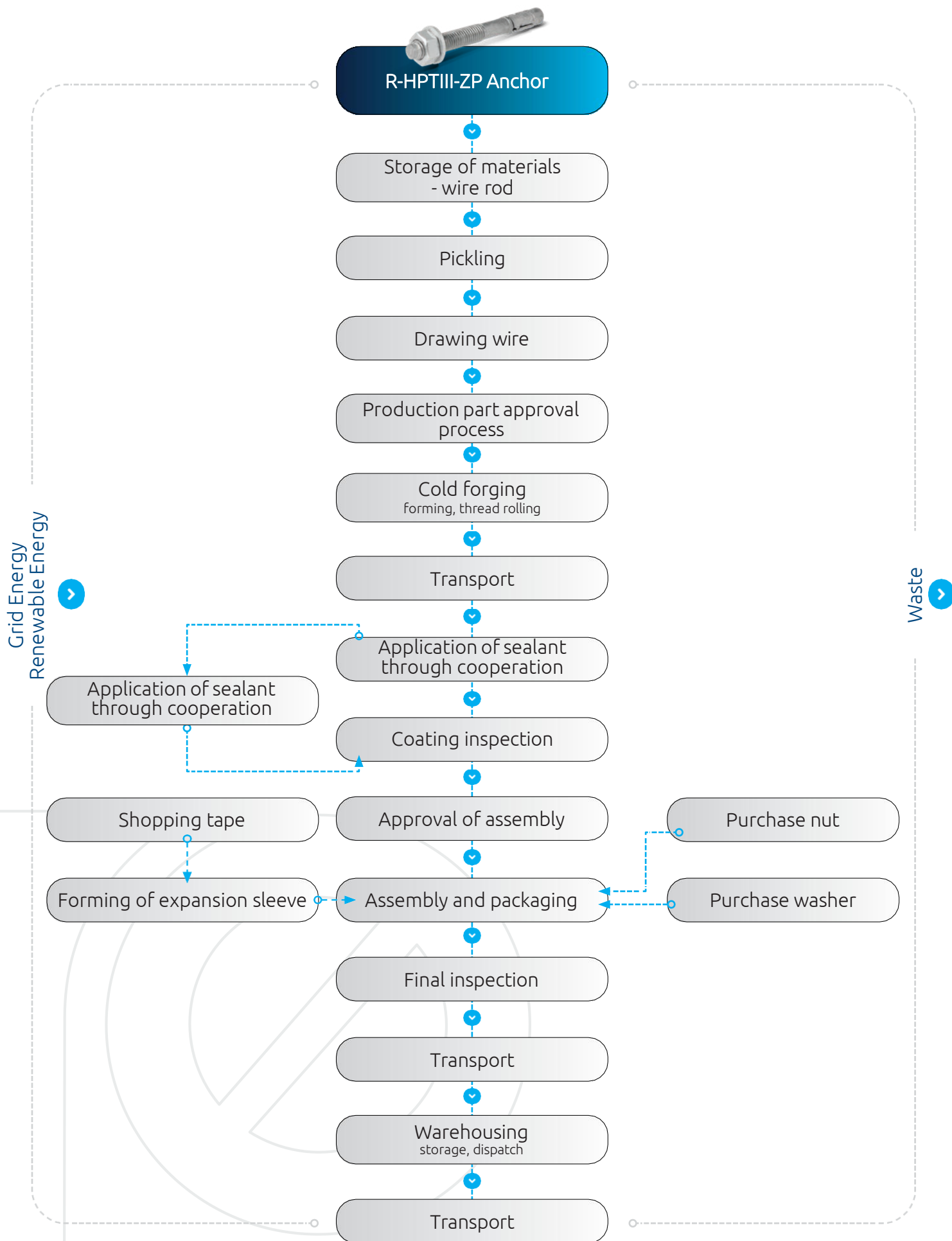


Figure 2.
Schematic diagram of the R-HPT-III-ZP anchor

Table 1.
Composition of mechanical anchor components R-HPTIII-ZP

Component A (screw, washer and nut)	
Material	Percentage [%]
Carbon steel	99,4
Additives	0,6
Component B (expansion band)	
Material	Percentage [%]
Stainless steel	100,0







The manufacturing process of the R-HPTIII-ZP mechanical anchor begins with the storage of raw materials, i.e. steel wire rods, which form the basis for further production. The raw material is then subjected to a pickling process to remove mill scale and surface contaminants. The cleaned material goes to the wire drawing stage, where the wire rod is transformed into wire of the appropriate diameter. After the initial processing of the material, serial production is approved, which allows mass production to begin. The next stage is cold forging, during which the shape of the anchor is formed and its threads are rolled. The formed elements are then transported to subsequent operations.

An important stage is electroplating, which involves covering the elements with a protective layer to protect them from corrosion. The quality and thickness of the coating is carefully checked, and if necessary, the anchors can be additionally subjected to a sealing process carried out by a partner.

At the same time, purchased components such as nuts, washers and steel strips are prepared. The nuts and washers also undergo galvanic treatment, and the steel strips are stamped into the bands needed for assembly. Once all parts have been prepared, the assembly is approved, followed by the assembly and packaging of the finished anchors. At this stage, all components are assembled: the anchor bolt, nut, washer and band. The finished products undergo a final quality control check and are then sent for transport.

In the final phase, the anchors are sent to storage, where they are stored and prepared for shipment. Finally, the end product is handed over for transport and delivered to customers.



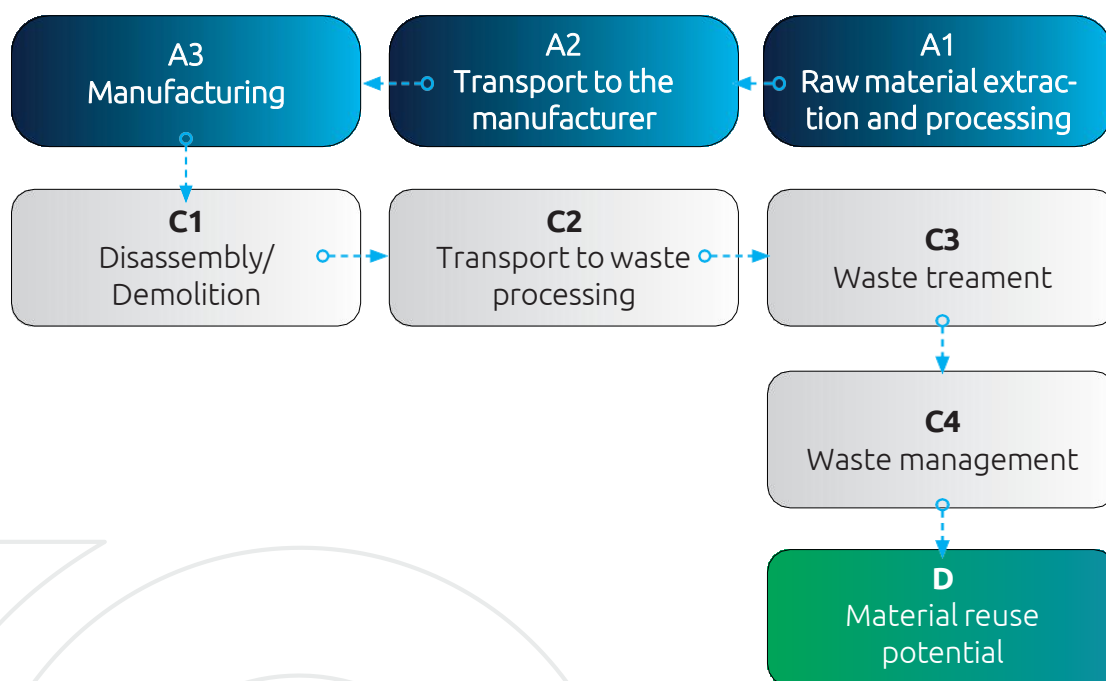
3. LCA: CALCULATION RULES

The environmental declaration is based on data provided by the declaration owner, Rawlplug S.A., for the plant where the product is manufactured:

- Koelner Rawlplug IP Sp. z o.o. Oddział w Łańcut, Podzwierzyniec 41, 37-100 Łańcut
The input and output flow values were calculated based on data provided by the manufacturer from the production plant for the period January 1, 2024 - December 31, 2024 (12 months).

System limitations

The life cycle analysis of the tested products includes modules A1- A3, C1-C4 and D (Cradle to Gate with options) in accordance with PN-EN 15804.



Data colleration period

Data regarding the production process were provided in 2025 for the period 01/01/2024 - 31/12/2024 (12 months) and correspond to the production technology at that time.

Declared unit

1 kg

Assumptions

A1 – raw material extraction refers to specific mass shares in the production process per declared unit of product.

A2 – transport to the production plant gate, with means of transport varying depending on delivery method,

A3 – CO₂, NO_x, SO₂, and dust emission values from the production process obtained as a result of an estimate based on fuel consumption,

C1 – covers end-of-life processes for mechanical anchors occurring during dismantling/demolition. Calculations are performed based on a developed scenario,

C2 – includes processes related to the end of life of the mechanical anchor generated during dismantling/demolition. Calculations are performed based on a developed scenario,

C3 – considers the environmental impact during the processing of demolition waste containing mechanical anchor components at a waste recovery facility. Calculations are performed based on a developed scenario,

C4 – includes the final management processes of the used mechanical anchor. Calculations are performed based on a developed scenario,

D – concerns the impact and consequences of using recycled material. Calculations are performed based on a developed scenario.

Cut-off criteria

Ninety-nine percent of all mass flows involved in the production process were accounted for. All energy used in production was included in the environmental declaration.

Dane ogólne

The data for the calculations come from Ecoinvent v. 3.10 and have been supplemented with KOBiZE CO₂, SO₂, NO_x, CO and total particulate matter emission factors for electricity, December 2024. Emission factors for electricity were determined using the actual KOBiZE data. The Polish electricity emission factor used (Ecoinvent supplemented with current national data from KOBiZE) is 0.597 kg CO₂/kWh. A detailed analysis of data quality was part of an external audit.

Alokacja

All data regarding unit processes from a single production plant were obtained via Data Acquisition Questionnaires, completed and verified by the declaration owner – Rawlplug S.A. The original data was referenced to the declared product unit, i.e., 1 kilogram. The allocation principles used are consistent with the requirements of the EN 15804+A2 standard and the ICIMB-PCR Part A guidelines. All data were normalized to the declared unit level and recalculated in accordance with the principle of representativeness of the technological process at the analyzed plant.

4. LCA: SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

The life cycle assessment (LCA) was conducted in accordance with the requirements of the PN-EN ISO 15804+A2:2020, PN-EN ISO 14025, and PN-EN ISO 14040 standards. The product categorization rules were adopted based on the guidelines of the PN-EN 15804 standard. Data used in the life cycle analysis (LCA) were obtained from Data Acquisition Questionnaires (DQs) completed by the declaration owner, Rawlplug S.A., and verified during a data audit. This data is not older than five years, and none of the generic datasets used is older than ten years. Data completeness, representativeness, and consistency were assessed as good. The quality of the specific data (LCI) was assessed as part of the verification process. In line with the „cradle to gate with options” framework, this environmental declaration also includes scenarios for the product’s end-of-life phase (modules C1–C4) and potential benefits and burdens beyond the system boundary (module D).

C1 – Dismantling covers the processes associated with the end of life of a mechanical anchor, which is typically invisible or impossible to separate from the structure (e.g., concrete). The dismantling process primarily involves the mechanical demolition of the components containing it, i.e., using excavators equipped with hammers. This module also considers the emissions resulting from these activities.

Impact: fuel consumption (excavator with hammer and crusher)

0,01956	l/kgprod
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C2 – In order to calculate the impact of this module, the following assumptions were made:

- 100% of the waste mass is transported to a recovery facility as part of waste 17 01 01 or 17 01 02 (construction debris),
- Transport is carried out using dump trucks with a load capacity of 16-32 tons, meeting EURO 6 emission standards,
- The material is transported to a waste processing facility located within 50 km of the demolition site.

C3 – Waste processing, e.g., collection of demolition waste fractions and processing of material streams intended for reuse, recycling, and energy recovery. Based on national experience, it is assumed that construction debris containing mechanical anchors is valuable waste and is subject to recycling. Steel elements are often separated using electromagnets (anchors can be recovered together with steel scrap). The resulting steel scrap is sent for recycling, often for remelting. Therefore, the following processes were assumed for the calculations: unloading (loader), crushing (crusher).

The following were assumed for the calculations:

zużycie energii	0,03	kWh/kg
zużycie paliwa	0,315	MJ/kg

The benefits of using these secondary materials are covered in Module D.

C4 – The developed scenario assumes the storage of 15% of the waste containing mechanical anchor elements remaining after magnetic separation.

D – includes potential environmental benefits from recovery and reuse. Benefits and burdens beyond the system boundaries are considered. The final product is assumed to be recycled, reducing the need for primary steel production. Energy recovery from packaging processing is included.

4. LCA: RESULTS

The table below shows the LCA modules taken into account when calculating the environmental impact categories for the products covered by the declaration.

SYSTEM BOUNDARIES (X –MODULE INCLUDED IN LCA, MND – MODULE NOT DECLARED)																
Products stage			Con-struction process stage		Use stage							End-of-life stage				Benefits and loads beyond the system boundary
Raw material supply	Transport	Production	Transport	Construction process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction	Transport	Waste processing	Disposal	Reuse-recov-ery-recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

The following tables present the results of the LCA analysis for mechanical anchor R-HPT-III-ZP. Explanations of the abbreviations used to describe the impact category are provided below:

GWP-total	Global warming potential
GWP-fossil	Global warming potential fossil fuel
GWP-biogenic	Global warming potential biogenic
GWP-luluc	Global warming potential land use and land change
ODP	Depletion potential of the stratospheric ozone layer

AP	Acidification potential of land and water
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 Exceedance
POCP	Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals & metals	Abiotic depletion potential for nonfossil resources
ADP-fossil	Abiotic depletion potential for fossil resources
WDP	Water (user) deprivation potential
PM	Potential incidence of disease due to PM emissions
IRP	Potential Human exposure efficiency relative to U235
ETP-fw	Potential comparative Toxic Unit for ecosystems
HTP-c	Potential comparative Toxic Unit for humans (cancerogenic)
HTP-nc	Potential comparative Toxic Unit for humans (non-cancerogenic)
SQP	Potential soil quality index
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials
PERM	Use of renewable primary energy resources used as raw materials
PERT	Total use of renewable primary energy resources
PEN-RE	Use of non-renewable primary energy resources excluding non-renewable primary energy resources used as raw materials
RE	Use of non-renewable primary energy resources used as raw materials
PENRT	Total use of non-renewable primary energy resources
SM	Use of secondary material
RSF	Use of renewable fuels
NRSF	Use of non-renewable secondary fuels
FW	Use of net fresh water

MAIN IMPACT INDICATORS: 1 kilogram mechanical anchor R-HPT-III-ZP

Life Cycle Stage									
Indicator	Unit	A1	A2	A3	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq.	2,48E+00	7,43E-02	1,81E-01	8,35E-02	8,44E-03	6,04E-02	4,18E-04	-1,50E+00
GWP-fossil	kg CO ₂ eq.	2,46E+00	7,42E-02	1,81E-01	8,35E-02	8,43E-03	6,03E-02	4,17E-04	-1,51E+00
GWP-biogenic	kg CO ₂ eq.	7,41E-03	4,27E-05	3,21E-04	9,13E-06	5,84E-06	1,03E-04	1,11E-06	5,96E-03
GWP-luluc	kg CO ₂ eq.	7,95E-03	2,63E-05	1,33E-04	7,25E-06	2,80E-06	4,36E-05	4,35E-08	-3,12E-04
ODP	kg CFC11 eq.	1,88E-08	1,43E-09	3,10E-09	1,28E-09	1,68E-10	5,30E-10	6,44E-12	-6,21E-09
AP	mol H+ eq.	8,54E-03	3,88E-04	7,54E-04	7,54E-04	1,76E-05	4,07E-04	3,70E-06	-5,20E-03
EP-freshwater	kg PO ₄ eq.	1,15E-03	4,72E-06	1,02E-04	2,44E-06	5,71E-07	3,42E-05	1,23E-08	-5,83E-04
EP-marine	kg N eq.	2,05E-03	9,54E-05	2,39E-04	3,50E-04	4,22E-06	1,54E-04	1,71E-06	-1,24E-03
EP-terrestrial	mol N eq.	2,08E-02	1,05E-03	2,41E-03	3,83E-03	4,55E-05	1,62E-03	1,87E-05	-1,33E-02
POCP	kg NMVOC eq.	7,32E-03	4,15E-04	7,63E-04	1,14E-03	2,92E-05	4,81E-04	5,60E-06	-4,61E-03
ADP-minerals & metals	kg Sb eq.	1,11E-05	2,22E-07	2,84E-07	2,98E-08	2,74E-08	5,09E-08	1,71E-10	-7,59E-07
ADP-fossil	MJ	2,58E+01	1,03E+00	2,32E+00	1,09E+00	1,19E-01	7,22E-01	5,46E-03	-1,56E+01
WDP	WDP (m ³) świat. ekw	1,09E+00	4,07E-03	-8,98E-03	2,37E-03	4,92E-04	2,36E-03	1,18E-05	-9,68E-02

ADDITIONAL IMPACT INDICATORS: 1 kilogram mechanical anchor R-KEX-III-ZP

Life Cycle Stage									
Indicator	Unit	A1	A2	A3	C1	C2	C3	C4	D
PM	Disease incidence	1,58E-07	5,08E-09	1,08E-08	2,14E-08	6,21E-10	8,35E-09	1,07E-10	-1,02E-07
IRP	kBq U235 eq.	1,40E-01	1,25E-03	1,63E-03	4,89E-04	1,54E-04	4,55E-04	3,01E-06	-1,77E-02
ETP-fw	CTUe	7,15E-04	2,94E-06	6,35E-05	1,52E-06	3,55E-07	2,13E-05	7,67E-09	-3,63E-04
HTP-c	CTUh	4,93E-07	5,01E-10	3,68E-10	3,26E-10	5,98E-11	1,53E-10	1,61E-12	-4,85E-07
HTP-nc	CTUh	1,78E-08	6,05E-10	1,29E-09	1,35E-10	7,44E-11	4,07E-10	7,36E-13	-5,14E-09
SQP	-	8,04E+00	5,65E-01	2,96E-01	7,68E-02	7,16E-02	1,09E-01	6,72E-03	-2,99E+00

**INDICATORS DESCRIPTIONS RESOURCE CONSUMPTION:
1 kilogram mechanical anchor R-KEX-III-ZP**

Life Cycle Stage									
Indicator	Unit	A1	A2	A3	C1	C2	C3	C4	D
PERE	MJ	2,12E+00	1,66E-02	2,02E-01	6,70E-03	2,04E-03	4,47E-02	1,63E-04	-3,40E-01
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	2,12E+00	1,66E-02	2,02E-01	6,70E-03	2,04E-03	4,47E-02	1,63E-04	-3,40E-01
PEN-RE	MJ	2,74E+01	1,09E+00	2,50E+00	1,16E+00	1,26E-01	7,67E-01	5,80E-03	-1,66E+01
RE	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	2,74E+01	1,09E+00	2,50E+00	1,16E+00	1,26E-01	7,67E-01	5,80E-03	-1,66E+01
SM	kg	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	2,86E-02	1,73E-04	1,50E-03	4,38E-05	2,16E-05	4,83E-04	2,23E-07	-2,19E-03

**INDICATORS DESCRIBING OUTPUT STREAMS AND WASTE:
1 kilogram mechanical anchor R-HPT-III-ZP**

Life Cycle Stage									
Indicator	Unit (expressed per DU)	A1	A2	A3	C1	C2	C3	C4	D
Hazardous waste	kg	WN	WN	4,56E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste	kg	WN	WN	1,65E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Radioactive waste	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Components for re-use	kg	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	WN	WN	2,17E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	WN	WN	2,29E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ/energy carrier	WN	WN	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,94E-02

BIOGENIC CARBON

Contents organic carbon in product (kg C _{org})	0,00E+00
Contents organic carbon in packaging (kg C _{org})	0,00E+00

6. INTERPRETATION

Figure 3. presents diagrams of the shares of individual life cycle modules on the basic impact categories for mechanical anchor R-HPT-III-ZP.

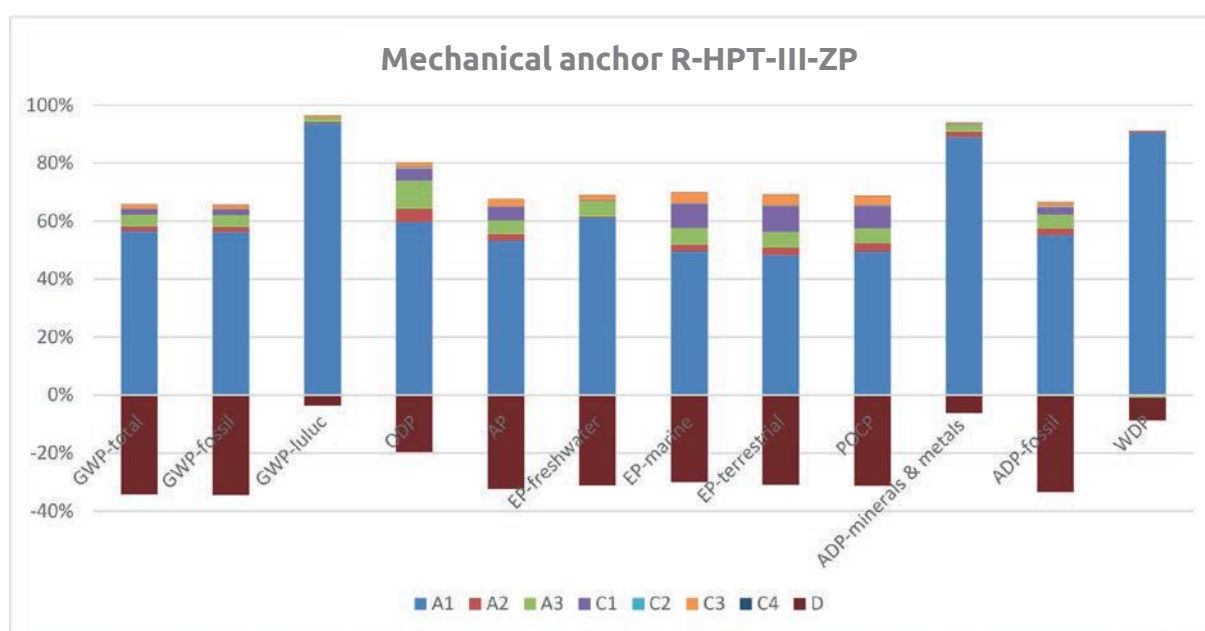


Figure 3.
Shares of life cycle modules in the main categories of impacts – mechanical anchor HPT-III-ZP.

BIBLIOGRAPHY

- ICIMB-PCR A. General Product Category Rules for Construction Products.
- PN-EN ISO 14025:2014-04, Environmental labels and declarations -- Type III environmental declarations -- Rules and procedures.
- PN-EN 15804+A2:2020, Sustainability of building structures -- Environmental product declarations -Basic principles of categorization of construction products.
- PN-EN ISO 14040:2009 Environmental management. Life Cycle Assessment. Principles and structure.
- PN-EN ISO 14044:2009, Environmental management. Life Cycle Assessment. Requirements and guidelines.
- EN 15942:2012, Sustainability of construction works – Environmental product declarations – Communication format business-to-business.
- Additional explanatory material can be obtained from the company page of the declaration owner: <https://www.rawlplug.com//>

PROCESS ENGINEERING RESEARCH GROUP

TYPE III ENVIRONMENTAL DECLARATION CERTIFICATE

no. 01-10/2025

Products:

**Mechanical anchor
R-HPT III - ZP**

Owner:

**Rawlplug S.A.
6 Kwidzyńska str.,
51-416 Wrocław**

The declaration was developed in accordance with the requirements of the standard:

PN-EN 15804+A2: 2020-03

Sustainability of construction works
Environmental product declarations
Core rules for the product category of construction products

The declaration was verified in accordance with the requirements of the standard:

PN-EN ISO 14025:2010

Environmental labels and declarations
Type III environmental declarations. Principles and procedures

The certificate was issued for the first time on **October 01, 2025** and is valid for 5 years
or until the said EPD is amended.

**Process Engineering
Research Group Leader**



Ewa Głodek-Bucyk,
PhD Eng.



**Director of
Environmental
Engineering Center**



Joanna Poluszyńska, PhD

Opole, October 2025