

ENVIRONMENTAL PRODUCT DECLARATION
no. 11-09/2024

Ridge batten brackets



Declaration owner: FAWIKOM Honorata Weber

Program owner: Łukasiewicz – Institute of Ceramics and
Building Materials
Environmental Engineering Center



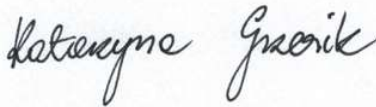
Name of program: Environmental Product Declarations – B2B

Date of issue: **25.09.2024**

Declaration valid until: **25.09.2029**

1. OVERVIEW

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|--|--|
| <p>Declaration owner:</p> <p>FAWIKOM Honorata Weber</p> | <p>Product of declaration:</p> <p>Ridge batten brackets: TYP BL, TYP 3 GW, TYP TOX, TYP 1, TYP BL-E, TYP BL-IRL, TYP 4.</p> |
| <p>Program Owner: Łukasiewicz – Institute of Ceramics and Building Materials Environmental Engineering Center in Opole. http://www.icimb.pl/opole/</p> | <p>Declaration owner: FAWIKOM Honorata Weber 63-405 Rososzycza, 5 Leśna street Telefon: +48 500341662 Adres e-mail: buiro@fawikom.pl https://www.fawikom.pl/</p> |
| <p>Date of issue:</p> <p>25.09.2024</p> | <p>Declared Unit:</p> <p>1 kg (1 kilogram) ridge batten bracket</p> |
| <p>Declaration valid until:</p> <p>25.09.2029</p> | <p>Scope: The declaration includes: Ridge batten bracket manufactured in the FAWIKOM Honorata Weber in Rososzycy.</p> <p>The environmental declaration is based on average data provided by the manufacturer for one production plant for individual products covered by the declaration manufactured by FAWIKOM Honorata Weber.</p> <p>All data regarding the production cycle were collected by FAWIKOM Honorata Weber from the period from January 1, 2023 to December 31, 2023 (12 months) and correspond to the production technology at that time.</p> <p>The life cycle assessment was developed 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 in accordance with the PN-EN 15804 standard.</p> <p>The owner of the declaration is responsible for the underlying information and evidence. Łukasiewicz Research Network - Institute of Ceramics and Building Materials Environmental Engineering Center is not responsible for the manufacturer's information, data and evidence regarding life cycle assessment.</p> <p>Declarations that are the result of different programs or are not performed in accordance with the standard may not be comparable.</p> |
| <p>Product Categorization (PCR) Rules</p> | <p>According to the standard:</p> <p>PN-EN 15804+A2:2020-03 Sustainability of construction works. Environmental Product Declarations. Basic principles of categorization of construction products, ICIMB-PCR A</p> |

| | |
|--|--|
| Representativeness: | Polish product, year 2023 |
| Declared durability: | 20 years |
| Reasons for performing LCA: | B2B |
| Life Cycle Analysis (LCA): | The LCA analysis includes modules A1-A3, A4, C1-C4 and D according to PN-EN 15804+A2 (Cradle-to-Gate with options) |
| The Łukasiewicz – Institute of Ceramics and Building Materials Environmental Engineering Center provides access to the Type III environmental declaration for ridge batten bracket manufactured by FAWIKOM Honorata Weber to interested parties. | |
| <p>Authors' team: Katarzyna Kiprian, M.Sc. Ewa Głodek-Bucyk, Ph.D. Patryk Okoń, M.Sc.</p> <p>Approved:</p> <p> Joanna Poluszyńska, PhD Director of the Center for Environmental Engineering</p> <p> Ewa Głodek-Bucyk, Ph.D. Leader of the Process Engineering Research Group</p> | <p>Review:</p> <p>CEN standard PN-EN 15804+A2 serves as the main PCR document. Independent verification of declarations and data according to EN ISO 14025:2010</p> <p><input type="checkbox"/> Internal <input checked="" type="checkbox"/> External</p> <p> Katarzyna Grzesik, PhD, DSc</p> |

2. MANUFACTURER AND PRODUCT INFORMATION

FAWIKOM Honorata Weber, from Rososzycza, has been successfully operating in three key areas for many years: production and sale of roof accessories, providing services in a modern powder paint shop, and execution of orders for sandblasting and welding of gates, fences and other structures on individual order. The company focuses on high quality and precision, providing aesthetic and durable solutions that meet customer expectations through a combination of commitment and expertise.

Ridge batten brackets are structural elements used in roof construction that are used to stabilize and support ridge battens on the roof.

Ridge battens are horizontal wooden or metal beams placed along the ridge line (the highest point of the roof). Ridge batten supports play a key role in ensuring a solid and safe roof structure. Their main task is to keep the battens at the right distance from each other and to ensure their stability and evenness.

Ridge batten brackets functions:

- supporting ridge battens - the brackets are mounted on the roof structure and constitute a support point for the ridge battens, which in turn support the roof covering (e.g. roof tiles, sheet metal),
- maintaining distance - the brackets maintain a constant distance between the ridge battens, which is important for the even and stable arrangement of roofing materials,
- ensuring stability - by ensuring even arrangement of the ridge battens and keeping them at the appropriate distance, the brackets contribute to the stability of the entire roof structure,
- protection against stress - the brackets reduce stress and loads on the ridge battens, which may occur as a result of temperature changes and snow or wind loads,
- preventing deformation - by evenly distributing the weight of the roofing, the brackets help to avoid deformation of the roofing materials and maintain the aesthetic appearance of the roof.

Production of ridge batten bracket follows the scheme (fig.1).



Figure 1: Production process of ridge batten bracket at the FAWIKOM Honorata Weber in Rososzycza.

The brackets are made of steel. Their shape and construction depend on the roof design, type of roofing and climatic conditions. It is important that they are properly selected and installed in accordance with building standards, which will ensure the durability, stability and safety of the entire roof structure.

The types and shape of individual ridge battens brackets manufactured by FAWIKOM Honorata Weber are shown in Figure 2.

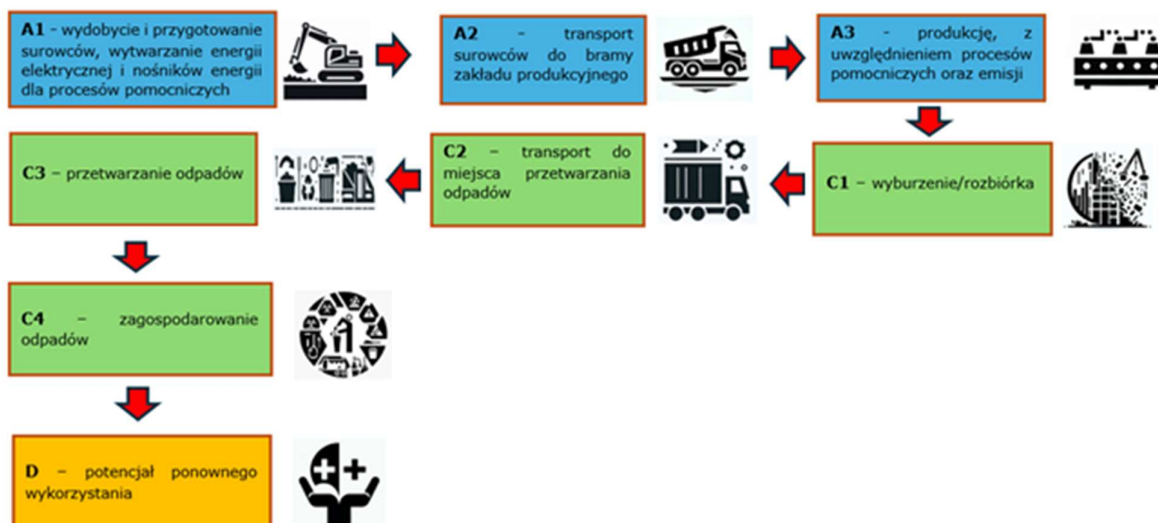


Figure 2. Types ridge batten bracket produced by FAWIKOM Honorata Weber.

3. LCA: CALCULATION RULES

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 EN 15804.



Data collection period

The data on the production process were provided in 2024 for the period 01.01.2023 – 31.12.2023.

Declared unit

1 kg (1 kilogram) ridge batten bracket.

Assumptions

A1 - extraction and consumption of raw materials refers to specific mass shares in the production process per declared unit of the product,

A2 - distances from the place of obtaining raw materials to the production plant, individual for each raw material, means of transport varied depending on the method of delivery of raw materials,

A3 - CO₂, NO_x, SO₂ and dust emission values from the production process obtained as a result of measurements carried out at the plant, the rest estimated on the basis of fuel consumption

C1 - describes how to handle the ridge batten support during dismantling/demolition. The calculations are performed based on the developed scenario.

C2 - refers to the transport of construction and demolition waste to a recovery or disposal plant. The calculations are performed based on the developed scenario.

C3 – takes into account the environmental impact during the treatment of construction and demolition waste containing elements of the ridge batten bracket at the waste recovery plant. The calculations are performed based on the developed scenario.

C4 – takes into account the environmental impact of the storage and recycling of ridge batten supports. The calculations are performed based on the developed scenario.

D – refers to the impact and effects of the use of secondary material. The calculations are performed based on the developed scenario.

Cut-off criteria

99% of all bulk streams involved in the production process were taken into account. All the energy used in the process was taken into account in the environmental declaration.

General data

The data for the calculations come from Ecoinvent v. 3.9.2 and KOBiZE. The emission factors for electricity were determined using the actual KOBiZE data. The applied emission factor of Polish electricity (Ecoinvent supplemented with current national data KOBiZE) is 0.685 kg CO₂/kWh. A detailed analysis of data quality was part of an external audit.

Allocation

All data on components manufactured at the FAWIKOM Honorata Weber in Rososzyca have been provided by the manufacturer and have been referred to the declared unit of the product – **1 kg** ridge batten bracket. The allocation rules used in this EPD are based on the general principles of ICIMB-PCR A.

4. LCA: SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

For the life cycle analysis of products covered by the “cradle to gate with options” environmental declaration, scenarios have been developed for modules C1-C4 and D:

Module C1 - Demolition/demolition – Manual demolition with the use of power tools such as drills, angle grinders, impact wrenches are adopted. On-site pre-sorting was adopted. The separated fractions are directed to the waste treatment plant. The energy chewing of power tools was assumed at the level of 0.0066 kWh/piece product.

Module C2 – Transport - Waste is transported to the treatment plant, where, after separating the recyclable fraction and the fraction intended for landfill, the appropriate quantities are transferred to subsequent processes.

1. Transport is carried out by trucks with a load capacity of 16-32 tons, meeting the EURO 6 emission standards,
2. Transport to the waste treatment plant takes place at 100 km from the demolition site.
3. Transport to the landfill takes place at 100 km from the waste treatment plant.

Module C3 - Waste treatment - It is assumed that all waste goes to the waste treatment plant. The following processes were assumed for the calculations: unloading (loader),

| | | |
|--------------------|-------|--------|
| Energy consumption | 0,03 | kWh/kg |
| Fuel | 0,315 | MJ/kg |

Module C4 – Waste management – It was assumed that 20% of waste separated in the treatment process would be landfilled (module C3).

Module D - Material reuse potential - The benefits of the thermal waste treatment process and the recycling of packaging waste (film, cartons, pallets) are taken into account

5. LCA: RESULTS

The table below shows the LCA modules taken into account in the calculation of the environmental impact categories for the products covered by the declaration.

| DESCRIPTION OF SYSTEM BOUNDARIES (X – INCLUDED IN LCA, MND – UNDECLARED MODULE) | | | | | | | | | | | | | | | | | |
|--|-----------|--------------------|-----------|----------------------|--------------|-------------|--------|----------|------------|--------------------|-------------------|------------|-------------------|-----------------|------------------|---------------------|---|
| Production stage | | Construction phase | | | Stage of use | | | | | | | | End of life stage | | | | Benefits and flows beyond the system boundaries |
| Mining & Sourcing | Transport | Production | Transport | Construction Process | Usufruct | Maintenance | Repair | Exchange | Renovation | Energy consumption | Water consumption | Demolition | Transport | Waste Treatment | Waste management | Potential for reuse | |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D | |
| X | X | X | X | MND | MND | MND | MND | MND | MND | MND | MND | X | X | X | X | X | |

The following tables present the results of the LCA analysis for ridge batten bracket. 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 kg ridge batten bracket | | | | | | | | | |
|--|----------------------------------|----------|----------|-----------|----------|----------|----------|----------|-----------|
| | Life cycle stage | | | | | | | | |
| Indicator | Unit | A1 | A2 | A3 | C1 | C2 | C3 | C4 | D |
| GWP-total | kg CO ₂ eq. | 2,97E+00 | 4,10E-02 | 2,54E-01 | 4,62E-02 | 2,22E-03 | 5,59E-02 | 5,58E-04 | -2,00E+00 |
| GWP-fossil | kg CO ₂ eq. | 2,95E+00 | 4,10E-02 | 3,98E-01 | 4,42E-02 | 2,22E-03 | 5,48E-02 | 5,56E-04 | -1,97E+00 |
| GWP-biogenic | kg CO ₂ eq. | 1,30E-02 | 2,82E-05 | -1,45E-01 | 2,01E-03 | 1,54E-06 | 1,06E-03 | 1,47E-06 | -2,01E-02 |
| GWP-luluc | kg CO ₂ eq. | 2,05E-03 | 1,39E-05 | 2,95E-04 | 3,95E-05 | 7,36E-07 | 2,35E-05 | 5,79E-08 | -6,38E-04 |
| ODP | kg CFC11 eq. | 2,06E-08 | 8,15E-10 | 7,07E-09 | 2,81E-11 | 4,41E-11 | 4,98E-10 | 8,58E-12 | -4,72E-09 |
| AP | mol H+ eq. | 1,25E-02 | 8,50E-05 | 2,98E-03 | 6,88E-06 | 4,62E-06 | 2,88E-04 | 4,93E-06 | -1,13E-02 |
| EP-freshwater | kg PO ₄ eq. | 1,29E-03 | 2,85E-06 | 1,24E-04 | 9,02E-06 | 1,50E-07 | 5,66E-06 | 1,64E-08 | -1,16E-03 |
| EP-marine | kg N eq. | 2,78E-03 | 2,02E-05 | 1,10E-03 | 3,16E-06 | 1,11E-06 | 1,34E-04 | 2,28E-06 | -1,16E-03 |
| EP-terrestrial | mol N eq. | 2,86E-02 | 2,18E-04 | 1,18E-02 | 1,58E-05 | 1,20E-05 | 1,45E-03 | 2,49E-05 | -1,08E-02 |
| POCP | kg NMVOC eq. | 9,95E-03 | 1,40E-04 | 3,71E-03 | 5,93E-06 | 7,68E-06 | 4,34E-04 | 7,47E-06 | -5,97E-03 |
| ADP-minerals & metals | kg Sb eq. | 2,06E-05 | 1,40E-07 | 1,59E-06 | 3,48E-08 | 7,22E-09 | 2,95E-08 | 2,28E-10 | -1,99E-06 |
| ADP-fossil | MJ | 3,35E+01 | 5,76E-01 | 5,86E+00 | 2,99E-01 | 3,12E-02 | 5,70E-01 | 7,28E-03 | -1,74E+01 |
| WDP | WDP (m ³) world. ekw | 1,06E+00 | 2,40E-03 | 7,67E-02 | 4,09E-04 | 1,30E-04 | 1,11E-03 | 1,57E-05 | -9,02E-02 |
| ADDITIONAL IMPACT INDICATORS: 1 kg ridge batten bracket | | | | | | | | | |
| | Life cycle stage | | | | | | | | |
| Indicator | Unit | A1 | A2 | A3 | C1 | C2 | C3 | C4 | D |
| PM | Disease incidence | 4,55E-04 | 1,01E-06 | 1,07E-04 | 1,07E-07 | 2,74E-07 | 1,36E-05 | 2,39E-07 | -1,88E-04 |
| IRP | kBq U235 eq. | 2,47E-01 | 7,96E-04 | 1,64E-02 | 1,94E-04 | 4,05E-05 | 2,87E-04 | 4,01E-06 | -1,08E-02 |
| ETP-fw | CTUe | 7,91E-04 | 1,27E-05 | 7,92E-05 | 5,61E-06 | 9,35E-08 | 3,52E-06 | 1,02E-08 | -7,20E-04 |
| HTP-c | CTUh | 2,39E-07 | 2,94E-10 | 1,68E-09 | 1,37E-11 | 1,57E-11 | 1,31E-10 | 2,14E-12 | -5,43E-07 |
| HTP-nc | CTUh | 5,35E-08 | 3,59E-10 | 2,70E-09 | 4,01E-11 | 1,96E-11 | 7,22E-11 | 9,81E-13 | -1,77E-08 |
| SQP | - | 1,06E+01 | 3,32E-01 | 1,63E+01 | 6,70E-02 | 1,88E-02 | 6,42E-02 | 8,96E-03 | -4,01E+00 |
| INDICATORS DESCRIBING RESOURCE CONSUMPTION: 1 kg ridge batten bracket | | | | | | | | | |
| | Life cycle stage | | | | | | | | |
| Indicator | Unit | A1 | A2 | A3 | C1 | C2 | C3 | C4 | D |
| PERE | MJ | 3,71E+00 | 1,05E-02 | 3,58E+00 | 0,00E+00 | 5,37E-04 | 2,47E-02 | 2,17E-04 | -7,45E-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 | 3,71E+00 | 1,05E-02 | 3,58E+00 | 0,00E+00 | 5,37E-04 | 2,47E-02 | 2,17E-04 | -7,45E-01 |
| PEN-RE | MJ | 3,71E+01 | 5,97E-01 | 6,21E+00 | 0,00E+00 | 3,24E-02 | 6,44E-01 | 7,57E-03 | -2,36E+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 | 3,71E+01 | 5,97E-01 | 6,21E+00 | 0,00E+00 | 3,24E-02 | 6,44E-01 | 7,57E-03 | -2,36E+01 |
| SM | kg | 0,00E+00 | 0,00E+00 | 1,63E-02 | 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 | m ³ | 4,37E-02 | 1,18E-04 | 9,46E-03 | 2,85E-05 | 5,77E-06 | 3,14E-05 | 2,95E-07 | -1,22E-02 |

**INDICATORS DESCRIBING OUTPUT STREAMS AND WASTE
1 kg ridge batten bracket**

| Indicator | Unit (referenced to DU) | Life cycle stage | | | | | | | |
|-------------------------------|-------------------------------|------------------|----|----------|----------|----------|----------|----------|----------|
| | | A1 | A2 | A3 | C1 | C2 | C3 | C4 | D |
| Amount of hazardous waste | kg | WN | WN | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Amount of non-hazardous waste | kg | WN | WN | 1,63E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Amount of radioactive waste | kg | WN | WN | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Reusable components | kg | WN | WN | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Recyclable materials | kg | WN | WN | 1,63E-02 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 | 0,00E+00 |
| Energy Recovery Materials | kg | WN | WN | 7,20E-01 | 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 | 9,97E+00 |

BIOGENIC CARBON

| | |
|--|-----------------|
| Biogenic carbon content in the product (kg C_{org}) | 0,00E+00 |
| Biogenic carbon content per package (kg C_{org}) | 4,76E-02 |

6. INTERPRETATION OF RESULTS

Figure 3 shows a graph of the contributions of individual life cycle modules to the basic categories of impact of ridge batten bracket:

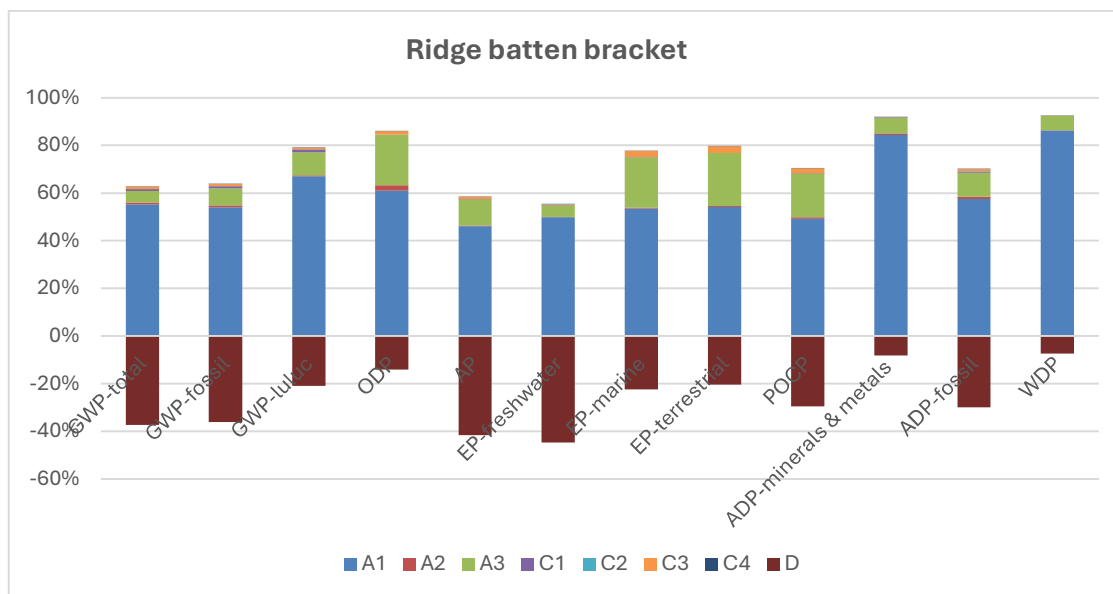


Figure 3 Shares of life cycle modules on the main categories of impacts – ridge batten bracket.

LITERATURE

- ✓ 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.
 - ✓ The Act of 14 December 2012 on Waste, Journal of Laws. 2013, item 21.
 - ✓ ISO 21930:2017 - Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
 - ✓ Act of 27 April 2001. Environmental Protection Law Journal of Laws 2024.54, consolidated text.
 - ✓ PN-EN 10346:2015-12 - Cold-galvanized steel sheets. Technical delivery terms.
 - ✓ PN-EN 1090-1:2012 - Execution of steel and aluminium structures - Part 1: Principles of conformity assessment of structural elements
 - ✓ Data from the company's website: <https://www.fawikom.pl/>
- Explanatory material can be obtained by contacting the representative directly FAWIKOM Honorata Weber



Łukasiewicz

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PROCESS ENGINEERING RESEARCH GROUP

TYPE III ENVIRONMENTAL DECLARATION CERTIFICATE

no. 11-09/2024

Products:

Ridge batten brackets

Owner:

FAWIKOM Honorata Weber

5 Leśna Street

63-405 Rososzyca

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:

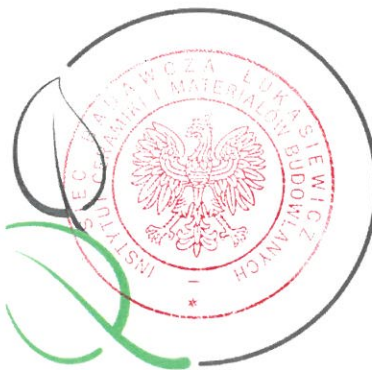
PN-EN ISO 14025:2010

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

The certificate was issued for the first time on **September 25, 2024** 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, September 2024