



Issuance date: 13.03.2026
Validation: 15.04.2026
Validity date: 13.03.2031

Gutter system - ZENIT



Owner of the EPD:

Balex Metal Sp. z o. o.
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ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org

Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804+A2 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment. Their aspects were verified by the independent body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804+A2.

Life cycle analysis (LCA): A1-A3, A4-A5, C1-C4 and D modules in accordance with EN 15804+A2 (Cradle-to-Gate with options)

The year of preparing the EPD: 2026

Product standards: PN-EN 612:2006; PN-EN 1462:2006

Service Life: 40 years

PCR: ITB-PCR A

Declared unit: 1 kg

Reasons for performing LCA: B2B

Representativeness: Slovakia, Europe, 2023

MANUFACTURER

Balex Metal Sp. z o.o. is a manufacturer of sandwich panels, roofing sheets, thermal insulation, cold-formed profiles, guttering and trapezoidal sheets. For more than 25 years it has been present in the market of building materials manufacturers, providing solutions for industrial, residential and agricultural construction.

Balex Metal Sp. z o.o. offers not only proven building materials, but also ensure safety and support at every stage of cooperation. Balex Metal Sp. z o.o. has 7 production facilities and 10 sales branches:

Poland

- Bolszewo
- Tomaszów Mazowiecki
- Długołęka

Slovakia

- Žilina

Czech Republic

- Hradec Kralove
- Plzen-Slovany
- Luka na Jihlavou

Latvia

- Riga
- Broceni

Lithuania

- Wilno



Figure 1 A view of Balex Metal production plant located in Bolszewo (Poland).

PRODUCTS DESCRIPTION AND APPLICATION

Steel gutter system is a solution for draining water from the roof.

The characteristic features of Zenit gutters offered by Balex Metal include:

- high durability; steel sheet provides the gutter system with resistance to mechanical and thermal loads, which makes it more durable compared to other solutions;
- corrosion resistance; Zenit system fasteners (elbows, outlets) have connecting seams on the sides, which protects them against water penetration and possible degradation;
- efficiency; Zenit system gutters drain up to 30% more water than other systems with comparable gutter width;
- Ease of installation; steel gutters are lightweight, which makes their installation quick and easy.

It is also significant that the Zenit gutter was designed by roofers. That is why all the elements of the system fit together, and their installation does not require additional sealing. The declaration covers the products listed in the Table 1.

Table 1 List of products covered by the declaration, together with their characteristics

Name	Steel grade	Width of gutter expansion [mm]:	Cross-sectional diameter of the rainwater [mm]:	Gutter/pipe material type:
Gutter system ZENIT	DX51D/ DX52D/ DX53D/ DX54D	248 for gutter diameter 105 mm (25) 280 for gutter diameter 127 mm (28) 329 for gutter diameter 153 mm (33) 398 for gutter diameter 192 mm (40)	80 / 100 / 120 / 150	St



More information can be found on the Balex Metal Sp. z o.o. website : [https:// www.balex.eu/](https://www.balex.eu/)

LIFE CYCLE ASSESSMENT (LCA) – general rules applied

Declared Unit

The declaration refers to declared unit (DU) – 1 kg of reference product Gutter system – ZENIT manufactured in Lietavská Lúčka, Žilina (Slovakia).

System boundary

The life cycle analysis of the declared products covers “Product Stage” A1-A3, A4-A5, C1-C4+D modules in accordance with EN 15804+A2 and ITB PCR A v1.6. (cradle to gate with options). Energy and water consumption, emissions as well as information on generated wastes were inventoried and were included in the calculation. It can be assumed that the total sum of omitted processes does not exceed 2% of all impact categories. In accordance with EN 15804+A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

Allocation

The allocation rules used for this EPD are based on general ITB PCR A, v. 1.6. Production of gutter system – ZENIT is a line process conducted in the factory located in Žilina (Slovakia). Allocation was done on product mass basis. All impacts from raw materials extraction and processing are allocated in module A1 of LCA. Impacts from the production were inventoried on the annual production volume expressed in mass units. Water and energy consumption, associated emissions and generated wastes are allocated to module A3. Packaging materials were taken into consideration.

System limits

100% materials and 100% energy consumption were inventoried in a factory and were included in calculation. In the assessment, all significant parameters from gathered production data are considered, utilized energy, and electric power consumption, direct production waste, and available emission measurements. The total of neglected input flows per module A1-A3 does not exceed the permitted maximum of 1 % of energy usage and product mass. Tires consumption for transport was not taken into account. It is assumed that the total sum of omitted processes does not exceed 2% of all impact categories. In accordance with EN 15804+A2 machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

Modules A1 and A2: *Raw materials supply and transport*

Raw materials such as steel sheets and others additives, wooden materials, protective foil or packaging materials come from both local and foreign suppliers. Means of transport include big trucks (> 16 t), train and ship are applied. European standards for average combustion were used for calculations.

Module A3: *Production*

Raw materials such as steel sheets and others additives, wooden materials, protective foil or packaging materials are delivered to factory located in Lietavská Lúčka, Žilina, where are manufacturing in a few step process including: steel decoiling, cutting, metal profiling, bending. Then the components of gutter system are packing, palleting and shipment.

Module A4 and A5: Transport to consumer and Installation

Transport of solid reinforced concrete road slabs from the manufacturing plant to the construction site is carried out using specialized trucks. A transport distance of 100 km is considered (emission standard: Euro 5) with 100% load capacity. The installation energy is likely very low, approx. 5 kWh/ton of product.

Modules C1-C4 and D: End-of-life (EoL)

It is assumed that at the end-of-life, 100% of gutter system – ZENIT are demounted using electric tools (module C1) and is transported to waste processing plant which is 50 km away, on 16-32 t lorry EURO 5 (module C2). It is assumed that 95 % of steel sheets are energy/material recovery. The residue wastes are forwarded to a landfill in the form of mixed construction and demolition wastes 5 % steel sheets. End-of-life scenario was summarized in Table 2. Environmental burdens declared in module C4 are associated with waste-specific emissions to air and groundwater. A potential credit resulting from the recycling are presented in module D.

Table 2. End-of-life scenario for gutter system – ZENIT profiles

Material	Waste processing (energy / material recovery)	Landfilling
Steel	95 %	5 %

Data quality

The data selected for LCA analysis originates from ITB-LCI questionnaires completed by Balex Metal Sp. z o.o., using the inventory data, ITB database, Ecoinvent database v. 3.11. No specific data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency are judged as good.

Data collection period

Primary data provided by Balex Metal Sp. z o. o. covers a period of 01.01.2023 – 31.12.2023 (1 year). The life cycle assessments were prepared for Slovakia and Europe as reference area.

Assumptions and estimates

The impacts for representative of Gutter system – ZENIT were inventoried and calculated based on total consumption for all system products.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN15804+A2. Emission of greenhouse gases was calculated using the IPCC GWP method with a 100-year horizon. Emission of acidifying substances, emission of substances to water contributing to oxygen depletion, emission of gases that contribute to the creation of ground-level ozone, abiotic depletion, and ozone depletion emissions where all calculated with the EF 3.1. method. No mass balance approach was used. Biogenic content less than 5%.

Databases

The data for the processes come from the following databases: Ecoinvent v.3.11. Specific data quality analysis was a part of external audit.

Additional information

Slovak electricity emission factor used is 0.21 kg CO₂/kWh. As a general rule, no particular environmental or health protection measures other than those specified by law are necessary.

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LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit

The declaration refers to declared unit (DU) – 1 kg of gutter system - ZENIT. The following life cycle modules (Table 3) were included in the analysis. The evaluation results for the specific products are given in Tables 4-7.

Table 3. System boundaries for the environmental characteristics of gutter system - ZENIT life cycle

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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
MD	MD	MD	MND	MND	MND	MND	MND	MND	MND	MND	MND	MD	MD	MD	MD	MD

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Table 4. Life cycle assessment (LCA) results for specific product manufactured by Balex Metal Sp. z o.o. - environmental impacts (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	1.16E+00	4.18E-02	5.21E-02	1.25E+00	1.67E-02	3.43E-03	3.43E-03	8.34E-03	2.23E-01	2.64E-04	-8.94E-01
Greenhouse gas potential - fossil	eq. kg CO ₂	1.25E+00	4.18E-02	5.14E-02	1.35E+00	1.66E-02	3.43E-03	3.43E-03	8.31E-03	6.19E-02	2.63E-04	-9.30E-01
Greenhouse gas potential - biogenic	eq. kg CO ₂	-9.57E-02	2.67E-05	4.99E-04	-9.52E-02	5.68E-05	1.00E-07	1.00E-07	2.84E-05	1.61E-01	6.71E-07	-3.66E-02
Global warming potential - land use and land use change	eq. kg CO ₂	9.28E-04	1.39E-05	2.42E-04	1.18E-03	6.52E-06	1.20E-09	1.20E-09	3.26E-06	9.77E-06	2.49E-07	-5.63E-04
Stratospheric ozone depletion potential	eq. kg CFC ₁₁	2.45E-08	9.11E-10	4.00E-09	2.94E-08	3.85E-09	7.00E-14	7.00E-14	1.92E-09	7.56E-01	1.07E-10	-1.78E-08
Soil and water acidification potential	eq. mol H ⁺	4.60E-03	1.34E-04	1.84E-04	4.92E-03	6.75E-05	3.80E-08	3.80E-08	3.37E-05	5.16E-04	2.48E-06	-3.49E-03
Eutrophication potential - freshwater	eq. kg P	6.08E-04	2.85E-06	1.64E-05	6.27E-04	1.12E-06	6.50E-09	6.50E-09	5.59E-07	4.19E-07	2.45E-08	-4.42E-04
Eutrophication potential - seawater	eq. kg N	1.09E-03	4.52E-05	2.64E-05	1.16E-03	2.04E-05	5.50E-09	5.50E-09	1.02E-05	1.75E-03	8.62E-07	-8.10E-04
Eutrophication potential - terrestrial	eq. mol N	1.14E-02	4.91E-04	2.35E-04	1.21E-02	2.22E-04	4.65E-08	4.65E-08	1.11E-04	3.32E-03	9.43E-06	-8.46E-03
Potential for photochemical ozone synthesis	eq. kg NMVOC	5.62E-03	2.03E-04	9.76E-05	5.93E-03	6.80E-05	1.30E-08	1.30E-08	3.40E-05	7.23E-04	2.74E-06	-4.08E-03
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	1.70E-06	1.44E-07	3.88E-08	1.88E-06	5.89E-08	1.67E-11	1.67E-11	2.95E-08	1.40E-08	6.04E-10	-2.42E-06
Abiotic depletion potential - fossil fuels	MJ	1.45E+01	5.93E-01	1.55E+00	1.66E+01	2.47E-01	5.80E-05	5.80E-05	1.23E-01	5.87E-02	7.22E-03	-1.04E+01
Water deprivation potential	eq. m ³	4.37E-01	3.11E-03	2.17E-02	4.62E-01	1.14E-03	1.20E-06	1.20E-06	5.70E-04	1.38E-03	2.29E-05	-3.17E-01

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Table 5. Life cycle assessment (LCA) results for specific product manufactured by Balex Metal Sp. z o.o. - additional impacts indicators (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A5	C1	C2	C3	C4	D
Particulate matter	disease incidence	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA	INA	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA	INA	INA	INA	INA	INA

Table 6. Life cycle assessment (LCA) results for specific product manufactured by Balex Metal Sp. z o.o. - environmental aspects related to resource use (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.62E+00	9.65E-03	9.81E-02	1.73E+00	3.54E-03	4.30E-06	4.30E-06	1.77E-03	1.08E-03	6.27E-05	-1.44E+00
Consumption of renewable primary energy resources used as raw materials	MJ	9.75E-01	0.00E+00	0.00E+00	9.75E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	2.59E+00	9.65E-03	9.81E-02	2.70E+00	3.54E-03	4.30E-06	4.30E-06	1.77E-03	1.08E-03	6.27E-05	-1.44E+00
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.39E+01	5.93E-01	1.60E+00	1.61E+01	2.47E-01	5.82E-05	5.82E-05	1.23E-01	2.85E+00	7.22E-03	-1.04E+01
Consumption of non-renewable primary energy resources used as raw materials	MJ	5.77E-01	0.00E+00	0.00E+00	5.77E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.91E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	1.45E+01	5.93E-01	1.60E+00	1.67E+01	2.47E-01	5.82E-05	5.82E-05	1.23E-01	5.88E-02	7.22E-03	-1.04E+01
Consumption of secondary materials	kg	7.22E-01	2.65E-04	8.95E-05	7.23E-01	8.27E-05	5.30E-09	5.30E-09	4.14E-05	2.65E-05	1.52E-06	-5.36E-01
Consumption of renewable secondary fuels	MJ	3.13E-02	3.47E-06	2.44E-07	3.13E-02	9.11E-07	2.95E-11	2.95E-11	4.56E-07	3.60E-07	3.96E-08	-1.34E-02
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.70E-08	4.70E-08	0.00E+00	0.00E+00	0.00E+00	-4.25E-07
Net consumption of freshwater resources	m ³	1.06E-02	7.16E-05	7.57E-04	1.14E-02	3.10E-05	1.58E-08	1.58E-08	1.55E-05	5.20E-05	7.90E-06	-7.80E-03

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Table 7. Life cycle assessment (LCA) results for specific product manufactured by Balex Metal Sp. z o.o. - environmental information describing waste categories (DU: 1 kg)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste neutralized	kg	1.66E-01	8.49E-04	8.09E-04	1.67E-01	2.77E-04	6.00E-10	6.00E-10	1.38E-04	4.21E-09	7.67E-06	-1.28E-01
Non-hazardous waste neutralised	kg	2.54E+00	1.82E-02	8.60E-02	2.65E+00	4.92E-03	3.12E-08	3.12E-08	2.46E-03	1.10E-02	1.08E-04	-1.73E+00
Radioactive waste	kg	2.84E-05	1.74E-07	1.14E-05	3.99E-05	1.84E-08	4.35E-11	4.35E-11	9.21E-09	3.13E-07	4.79E-08	-2.06E-05
Components for re-use	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	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	3.12E-04	7.09E-06	1.73E-01	1.73E-01	7.64E-07	6.00E-11	6.00E-11	3.82E-07	3.92E-07	1.44E-08	0.00E+00
Materials for energy recovery	kg	7.11E-07	3.76E-08	1.06E-08	7.59E-07	6.18E-09	5.25E-13	5.25E-13	3.09E-09	4.89E-09	1.71E-10	0.00E+00
Energy exported	MJ	2.17E-02	2.59E-04	2.57E-04	2.22E-02	0.00E+00	1.73E-07	1.73E-07	0.00E+00	5.98E-02	0.00E+00	0.00E+00

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Verification

The process of verification of this EPD is in accordance with ISO 14025. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804+A2 and ITB PCR A
Independent verification corresponding to ISO 14025 (subclause 8.1.3.)
<input checked="" type="checkbox"/> external <input type="checkbox"/> internal
External verification of EPD: Halina Prejzner, PhD Eng
LCI data, audit and verification: Michał Chwedaczuk, M.Sc. Eng.
LCA, LCI audit and input data verification: Michał Piasecki, PhD. DSc. Eng

Note 1: The declaration owner has the sole ownership, liability and responsibility for the information provided and contained in EPD. Declarations within the same product category but from different programmes may not be comparable. Declarations of construction products may not be comparable if they do not comply with EN 15804 + A2. For further information about comparability, see EN 15804 + A2 and ISO 14025. Depending on the application, a corresponding conversion factor such as the specific weight per surface area must be taken into consideration.

Note 2: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products performance. ITB acts as the independent, third-party verification organization (17065/17025 certified). ITB-EPD program is recognized and registered member of The European Platform – Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

Normative references

- ITB PCR A, v. 1.6 General Product Category Rules for Construction Products
- EN 14509:2013 Self-supporting double skin metal faced insulating panels - Factory made products – Specification
- PN-EN 612:2006 Rynny dachowe i rury spustowe z blachy. Definicje, podział i wymagania
- ISO 14025 Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- ISO 20915:2018 Life cycle inventory calculation methodology for steel products
- EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- ISO 14067:2018 Greenhouse gases - Carbon footprint of products — Requirements and guidelines for quantification
- EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- Ecoinvent.org

LCA, LCI, input data verification
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CERTIFICATE № 916/2026 of TYPE III ENVIRONMENTAL DECLARATION

Products:

Gutter system - ZENIT

Manufacturer:

Balex Metal Sp. z o. o.

Wejherowska 12C, 84-239 Bolszewo, Poland

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

EN 15804+A2

Sustainability of construction works.

Environmental product declarations.

Core rules for the product category of construction products.

This certificate, issued on 13th March 2026 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics
and Environment Department


Agnieszka Winkler-Skalna, PhD



Deputy Director
for Research and Innovation


Krzysztof Kuczyński, PhD

Warsaw, March 2026