ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Sanitary elements: custom-made washbasins and BL-type standard washbasins for bathrooms, made of composite marble, from the following families: Kuma Marble, Kuma Granite, Kuma Granulon, Kuma Grasolit.
KUMA ROMANIA SRL

EPD HUB, HUB-5718
Published on 13.02.2026, last updated on 13.02.2026, valid until 12.02.2031

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2 (24 Mar 2025) and JRC characterization factors EF 3.1.

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	KUMA ROMANIA SRL
Address	85B Stupini St., Banesti, 107050, Prahova County, Romania
Contact details	office@kumaromania.ro; retail@kumaromania.ro;project@kumaromania.ro
Website	www.kumaromania.ro;www.kumaromania.com

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2, 24 Mar 2025
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Stefan Cosuta, Envirocert SRL
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Vera Durão, as an authorised verifier acting for EPD Hub Limited

PRODUCT

Product name	Sanitary elements: custom-made washbasins and BL-type standard washbasins for bathrooms, made of composite marble, from the following families: Kuma Marble, Kuma Granite, Kuma Granulon, Kuma Grasolit.
Additional labels	-
Product reference	-
Place(s) of raw material origin	Romania, Germany, Denmark
Place of production	Romania, Banesti Village, Prahova County
Place(s) of installation and use	Romania, Denmark, other EU countries
Period for data	calendar year 2025
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3 (%)	+/-1%
GTIN (Global Trade Item Number)	-
NOBB (Norwegian Building Product Database)	-
A1-A3 Specific data (%)	32,8

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
Mass of packaging	0,18267 kg
GWP-fossil, A1-A3 ($kgCO_2e$)	1,65
GWP-total, A1-A3 ($kgCO_2e$)	1,53
Secondary material, inputs (%)	0,8
Secondary material, outputs (%)	0,16
Total energy use, A1-A3 (kWh)	7,55
Net freshwater use, A1-A3 (m^3)	0,01

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Company Overview
KUMA Romania was founded in 1998 as a subsidiary of KUMA A.S. Denmark; KUMA Romania is a leading manufacturer of premium composite concepts for bathrooms and kitchens. With over 40 years of expertise inherited from the KUMA Group, the Romanian facility combines minimalist Nordic design with advanced technology to create high-quality, durable products for residential and commercial projects across Europe.

Innovative Product Portfolio
KUMA specializes in custom-made and standard washbasins, countertops, and integrated bathroom solutions. Our products are crafted from high-performance composite materials—including marble, granite, containing up to 80% natural materials. This results in surfaces that are:
- Highly Durable: resistant to impact, scratches, and stains, ideal for high-traffic environments.
- Easy to Maintain: non-porous surfaces that ensure hygiene with minimal effort.
- Repairable: surfaces can be repolished and restored, significantly extending the product's lifecycle and reducing the need for replacements.

Commitment to Sustainability & Circular Economy
Sustainability is at the core of KUMA's mission. We operate as a trendsetter in the industry by integrating circular economy principles into our production:
- Renewable Energy: our production facility uses 100% renewable electricity, with 25% currently generated by our own on-site photovoltaic plant.
- Waste Management: we are committed to a circular economy approach by minimizing waste throughout our production process. Where technically feasible, composite off-cuts are repurposed internally. All other manufacturing waste is strictly monitored and managed by certified partners for recovery or disposal, ensuring compliance with our ISO 14001 environmental objectives.
- Water Conservation: Through an internal recirculation system, we recover and reuse 43% of the water required for industrial cleaning.

Quality and Ethics
KUMA Romania operates under a robust Integrated Management System, holding international certifications for Quality (ISO 9001), Environment (ISO 14001), and Occupational Health and Safety (ISO 45001), certified by INTERTEK Group Plc

By choosing KUMA, customers invest in superior design and longevity while contributing to a greener, more responsible future.

PRODUCT DESCRIPTION

This Environmental Product Declaration covers custom-made washbasins and BL-type standard washbasins manufactured by KUMA Romania SRL. These sanitary elements are designed for residential, commercial, and public bathroom installations. The scope of this EPD includes products manufactured from the following composite material families: Kuma Marble, Kuma Granite, Kuma Granulon, and Kuma Grasolit.
As the chemical composition and manufacturing processes across these families are highly consistent—with raw material variations of approximately 1.5%—the environmental impact results are presented as an average value per 1 kg of product. This declared unit allows for a precise environmental assessment across the entire range of cast sanitary elements.

Technical Characteristic and applicable standards:

Technical Characteristic	Value / Property	Standards
Declared Unit	1 kg of average cast product	PCR Standard
Load resistance	1.50 kN	EN 14688
Cleanability	Passed	EN 14688
Resistance to chemicals	Passed	EN 14688
Durability	Passed	EN 14688
Surface Repairability	High (sandable and polishable)	Internal Standard
Water Absorption	< 0.5%	ISO 19712

Construction and Materials
KUMA means Continuous Surface Concept: The basin and countertop are cast as a single piece that enhances durability and makes maintenance easier.
KUMA sanitary elements are manufactured using a high-performance composite blend. Although specific aesthetics vary by family, the core composition remains uniform: natural minerals:
- approximately 78% marble powder,
- Binding Agents: high-quality polyester resins;
- Surface Treatment: specialized gelcoats ensuring a non-porous, hygienic finish.
The 1.5% variation in components between the four families does not significantly alter the environmental profile, justifying the use of a weighted average for this EPD.

Manufacturing and Sustainability
The production process takes place at the KUMA facility in Banesti, county Prahova, Romania, following strict sustainability protocols:
- Energy Profile: 100% of the electricity used is from renewable sources, with 25% produced internally via an on-site photovoltaic system.
- Circular Economy: composite waste is pulverized and reintegrated into the production cycle to manufacture secondary components (e.g., brackets), supporting a zero-waste future objective.
- Resource Efficiency: an internal filtration system enables the recirculation of 43% of the water used in technical processes.
- Emission Reduction: between 2022 and 2024, KUMA achieved a 31% reduction in CO2 emissions per product through optimized energy and material management.

Product Benefits
- Longevity & Repairability: the ability to repolish and repair the surface significantly extends the product's life, reducing the need for replacement.
- Hygienic Design: the non-porous surface prevents bacterial growth, meeting the highest standards for public and medical environments.
- Environmental Transparency: KUMA enables architects and developers to accurately calculate the environmental footprint of specific project configurations for BREEAM or LEED certifications.
- Finished products are delivered in protective, recyclable packaging, optimized for weight and transport efficiency.

Reference Service Life (RSL) for KUMA composite products is declared as 20 years. This value is based on recognized European benchmarks for sanitary appliances as BBSR (Germany) and BRE Global (UK).

Further information can be found at:
www.kumaromania.ro;www.kumaromania.com

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	0,21	France, EU
Minerals	77,85	Romania
Fossil materials	21,23	EU
Bio-based materials	0,71	Romania

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0,00272
Biogenic carbon content in packaging, kg C	0,0736

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg
Mass per declared unit	1 kg
Functional unit	-
Reference service life	20 years

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
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		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Not declared = ND.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

A market-based approach is used in modelling the electricity mix utilized in the factory.

A1 – Raw material supply

This stage includes the extraction, processing and delivery of the primary materials that form the KUMA composite products. These include mineral fillers (such as marble powder), polyester resins, pigments, and functional additives. Additionally, auxiliary components like sanitary fittings are included in this stage. The quantities and environmental burdens of all material inputs are tracked and allocated to the declared unit of 1 kg of finished product.

A2 – Transport to factory

This stage covers the transportation of raw materials from the suppliers to the KUMA Romania manufacturing plant in Bănești, Prahova County, Romania. It includes inbound logistics for resins, minerals, and packaging components. The raw materials with the highest volume share, namely marble powder and polyester resins, are sourced from domestic suppliers within Romania. Transport distances are derived directly from the company's internal logistics records, while vehicle types, load factors, and fuel consumption are defined based on actual operational data to ensure the highest level of accuracy. Assumptions on empty-return trips and consolidation of loads are specified for the LCA modelling to reflect the regional transport infrastructure.

A3 – Manufacturing, Finishing and Packaging

In this stage, the raw materials are transformed into finished cast marble and solid surface products. Key processes at KUMA Romania include:

- Preparation and Mixing: precise dosing of resins, fillers, and catalysts followed by vacuum mixing to ensure a homogeneous composition.
- Casting and Curing: the mixture is poured into specialized molds, often utilizing specific tooling resins for mold maintenance, where the chemical curing process occurs.
- Finishing and Assembly: products are de-molded, sanded, and polished to achieve the final texture. Sanitary fittings are assembled where applicable.
- Emission Control: monitoring and treatment of Volatile Organic Compounds (VOCs), primarily styrene, resulting from the curing process. Data is derived from official air emission tests which monitor specific stacks across the production facility.

Electricity modeling: The environmental impact of electricity consumption during the manufacturing stage (A3) is calculated using the market-based approach, as mandated by EPD Hub PCR 1.2. The facility operates on 100% renewable electricity: self-generated solar power from the factory's photovoltaic system and purchased renewable energy.

Packaging: Includes the use of wood pallets, cartonboard and protective films to ensure safe delivery and handling.

Waste Management: Manufacturing waste, including resin off-cuts, mineral dust, and used solvents, is recorded and sent for recycling or disposal in accordance with internal environmental procedures. Waste streams consist primarily of ancillary materials and packaging waste (e.g., wood pallets, plastic films, and cardboard). These materials are collected and transported to authorized local treatment facilities for recovery and recycling. All transport distances for waste do not exceed 50 km from the facility, utilizing standard road transport.

System boundary and cut-off criteria

For modules A1–A3, the system boundary includes all processes under KUMA Romania's control up to the factory gate (Cradle-to-Gate). Processes excluded include the manufacture of capital goods (machinery, buildings) and indirect overheads. Cut-off criteria ensure that neglected mass, energy, or environmental flows do not exceed 5% of each inventory module.

Data quality and representativeness

The data used reflect the actual production period of KUMA Romania's operations. Foreground data, including specific electricity mix and VOC emission concentrations, are collected from internal monitoring and certified laboratory reports. Background data are derived from recognized LCA databases. The representativeness of the data is verified, and all assumptions regarding transport volumes and allocation are documented.

The use of renewable energy in manufacturing is demonstrated through contractual instruments (GOs, RECs, etc.), and its use is ensured throughout the validity period of this EPD.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

A4 – Transport to Building Site
This stage includes the transportation of the finished KUMA composite products from the manufacturing facility in Bănești to the construction or installation site. For KUMA Romania, this involves:
- Loading and securing: loading the finished washbasins, countertops, or other sanitary units onto transport vehicles at the factory gate. Products are properly secured using specialized packaging and pallets to prevent damage during transit.
- Logistics and Volume: transport is modeled based on the bulk volume of the products. For the declared unit of 1 kg, a representative specific volume is used to account for the product geometry and the necessary protective air space within the vehicle.
Transport Distances: the average transport distance is defined as 1600 km, a value calculated based on KUMA Romania's internal logistics records. This distance reflects the weighted average of domestic deliveries and major export routes, particularly to the Scandinavian markets.
Delivery: The transport stage ends when the products are delivered to the site or distribution center. Any packaging materials (wood pallets, plastic film, strapping, or cardboard) leaving the factory with the product are included within this stage.

A5 – Installation into the Building / Infrastructure
This stage covers the on-site installation of KUMA products. For KUMA Romania, the installation scenario is defined as follows:
- On-site handling: the installation process is primarily manual, involving the unpacking and positioning of the units (e.g., washbasins, countertops) into their final location within bathroom or kitchen areas.
- Energy consumption: energy use during installation is considered negligible and has been excluded from the system boundary, as the assembly and fixing processes do not require heavy machinery or significant power tool operation.
- Auxiliary materials: no auxiliary materials (such as silicone, adhesives, or specialized fasteners) are accounted for in this stage, as their mass is considered negligible (below the cut-off criteria) in relation to the total mass of the declared unit.
- Installation losses: it is assumed that there are no product losses or breakages during the installation process; therefore, no material waste from the KUMA product itself is recorded for this module.
Waste Management of Packaging: accounts for the collection and processing of all packaging materials removed during installation (wood pallets, cardboard, and plastic films). The end-of-life treatment for these materials is modeled using a split scenario to reflect regional waste management practices and infrastructure:
- Wood packaging: 32% is recycled, 30% is directed to energy recovery (incineration), and 38% is landfilled;
- Plastic packaging: 40% is recycled, 37% is directed to energy recovery (incineration), and 23% is landfilled;
- Cardboard and paper: 83% is recycled, 8% is directed to energy recovery (incineration), and 9% is landfilled.
All packaging waste is assumed to be transported over a representative distance of 50 km from the installation site to the authorized waste management or disposal facilities, utilizing standard heavy-duty vehicles

System Boundary and Cut-Off Criteria
For Modules A4–A5, the system boundary includes all processes from the dispatch of finished products at the KUMA factory until the unit is installed and ready for use. Excluded processes may include extensive plumbing work or integration of water systems not directly related to the product itself. Cut-off criteria ensure that neglected flows do not exceed the 5% threshold of each inventory module, as per EN 15804.
Data Quality and Representativeness
The data used for Modules A4 and A5 reflect the representative conditions of KUMA Romania's logistics and typical installation scenarios for sanitary ware.
Foreground data: transport distances, vehicle types, product volume allocation, and auxiliary installation materials are based on internal logistics records and documented assumptions.
Background data: emission factors for transport, vehicle performance, and waste treatment processes are sourced from recognized LCA databases (eg Ecoinvent) compliant with EN 15804.
Scenario assumptions: all assumptions regarding average transport distances and installation methods are documented and verified for representativeness.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

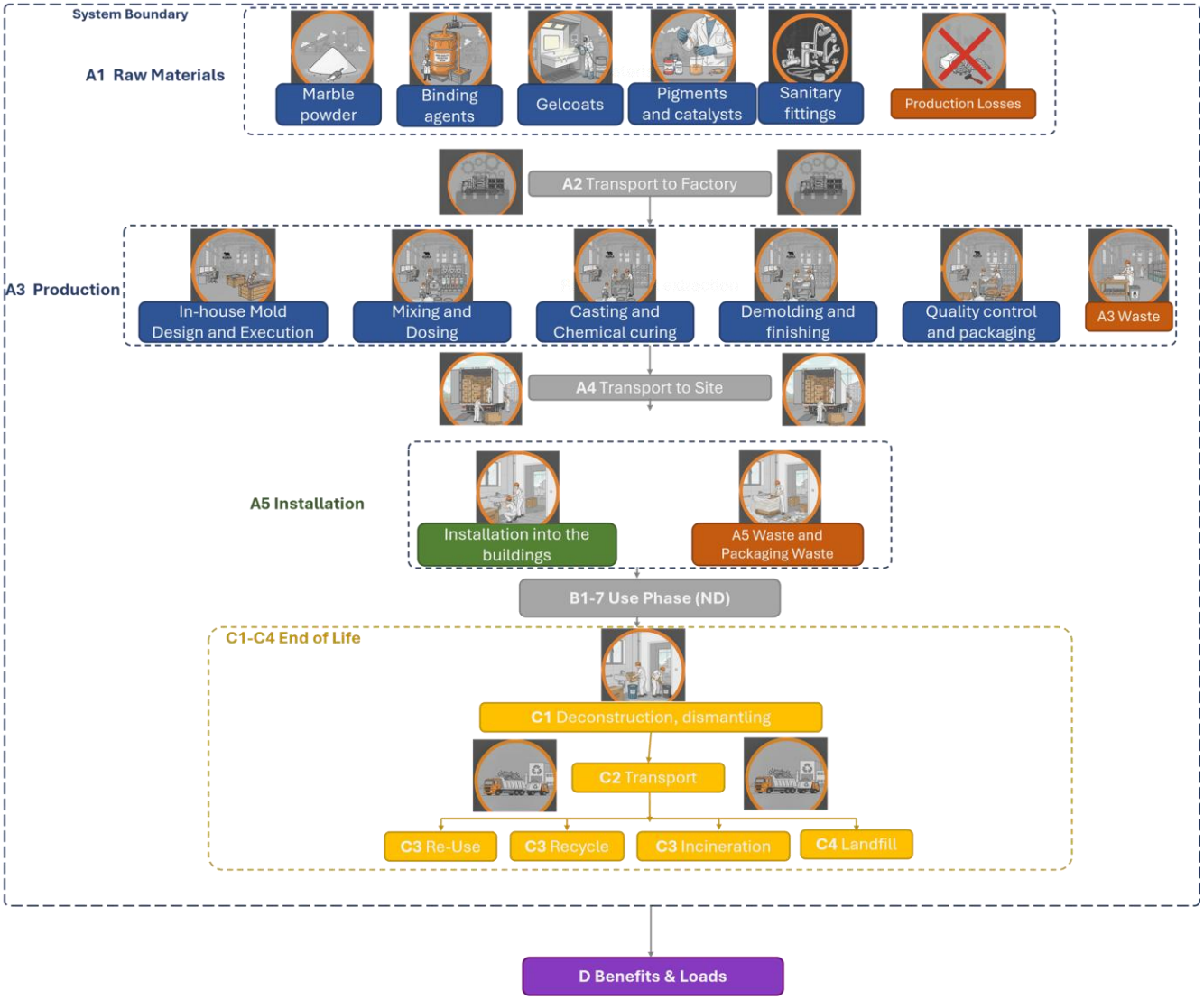
C1 – Deconstruction / Disassembly
At the end of their service life, KUMA products are removed from their installation points primarily through manual operations. The units are disconnected from the water and drainage systems using basic hand tools. Energy demand for this stage is considered negligible. As the materials are chemically stable, no hazardous emissions occur during disassembly.
C2 – Transport to Waste Processing Facilities
Following disassembly, the waste products are transported to authorized collection points or waste treatment facilities. Transport is assumed to occur via standard trucks over a representative distance (50-150 km). Emissions and fuel consumption are calculated based on the mass of the product, accounting for the regional logistics infrastructure in the markets where the products are disposed of.
C3 – Waste Processing
This stage involves the sorting and processing of discarded units. For products sold in the Scandinavian market (85% of the total volume), the material is directed towards high-efficiency municipal waste-to-energy plants. In these facilities, the composite material undergoes controlled thermal treatment to recover its energy content. For the remaining 15% of the product volume, the material is handled as inert construction waste.

C4 – Final Disposal
The disposal scenario is split based on market-specific practices:
- Incineration (85%): This scenario applies to the Scandinavian market. The polymer fraction (polyester resin) undergoes controlled thermal treatment, while the mineral filler remains as inert bottom ash.

- Landfill (15%): for the remaining fraction, the product is sent to compliant non-hazardous landfills for inert waste. KUMA products are stable and do not generate significant greenhouse gas emissions when landfilled.

Module D – Benefits and Loads Beyond the System Boundary
The recovery of energy and materials at the end-of-life provides net benefits beyond the system boundary, reported as negative impacts in Module D.
Net Flow Calculation: Net flows for recycling and energy recovery are determined by subtracting any secondary material inputs used in the production stage (A1-A3) from the total waste flows. As KUMA products consist primarily of virgin raw materials (mineral fillers and resins), the energy recovery flows are considered net flows.
- Energy Recovery: The recovery process is modeled based on R1-certified, high-efficiency Waste-to-Energy (WtE) plants in Scandinavia. The high thermal efficiency of these facilities (exceeding the 65% threshold as documented by regional authorities such as the Danish Energy Agency) justifies the energy credits reported in Module D.
- Substituted Processes: Due to this high efficiency, the resin acts as a secondary fuel source, generating exported electricity and district heating that substitute regional grid energy produced from fossil sources.
Packaging Recycling: benefits are also accounted for the recycling of packaging materials collected during the installation stage (Module A5). This includes credits for 91% of cardboard, 62% of wood packaging and 77% of plastic packaging. These credits reflect the avoided environmental burdens associated with the production of virgin packaging materials.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section on page 1 and 2. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging material	Allocated by mass
Ancillary materials	Allocated by mass
Manufacturing energy and waste	Allocated by mass

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	Multiple products
Grouping method	Based on average results of product group - by total mass
Variation in GWP-fossil for A1-A3, %	+/-1%

This EPD represents a weighted average of four composite material families: Kuma Marble, Kuma Granite, Kuma Granulon, and Kuma Grasolit. These product groups share a highly consistent chemical composition (77.7-78.5% mineral filler and 19.6-20.3% polyester resin binder) and are manufactured using identical casting and curing processes at the same facility in Banesti, Romania. The maximum variation in raw material composition between

these families is approximately 1%, which results in a negligible difference in environmental impact indicators. The use of a weighted average per 1 kg of finished product ensures a representative and transparent environmental profile for the entire range of KUMA custom-made and standard washbasins.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.4. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11/3.12 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11/3.12 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

The LCA for KUMA products is modeled in compliance with EN 15804:2012+A2 and the applicable PCR. The following sources and references underpin the modeling of life cycle stages:
Core Databases and Proxy Data
Ecoinvent 3.11: Primary source for upstream and downstream processes (raw materials, transport, and waste treatment).
IDEMAT 2024 Database: Used for specific material inventories of composite additives.
Federal LCA Commons: Utilized for specialized chemical precursor datasets.
Verified EPDs: Technical proxies for specific raw materials were derived from EPDs compliant with EN 15804+A2, ensuring consistency in environmental indicators.
Scenario-Specific References
Module A4 & C2 (Transport): Load factors and fuel consumption rates are based on Ecoinvent 3.11 data. Distances are calculated using regional logistics routing specific to KUMA's distribution network.
Module A5 (Installation & Packaging Waste): Material loss during installation is based on internal KUMA manufacturing tolerances. Packaging waste treatment rates (Recycling/Energy Recovery) are derived from EUROSTAT (Waste Statistics) and national reporting requirements.
Module C1 (Deconstruction): Energy demand for manual disassembly is justified as negligible based on industry-standard demolition protocols for interior fixtures.
Module C3 & C4 (End-of-Life): The 85/15 weighted average scenario is based on:
- Danish Environmental Protection Agency: Waste statistics confirming 100% incineration of combustible waste for the Scandinavian market.
- KUMA Romania (2024): Internal certified sales distribution records (used for weighting the regional scenarios).
- Emissions: EnEco Consulting SRL: Official laboratory reports for VOC and styrene emission factors.
- Certified Renewable Energy: 100% renewable energy certificates and on-site PV monitoring records (A3).

Washbasins Kuma produced in composite marble

ENVIRONMENTAL IMPACT DATA

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	7,85E-01	1,53E-01	5,96E-01	1,53E+00	3,68E-01	1,20E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,12E-02	8,85E-01	6,16E-03	-3,64E-02
GWP – fossil	kg CO_2e	7,91E-01	1,53E-01	7,02E-01	1,65E+00	3,68E-01	7,84E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,12E-02	4,66E-01	1,45E-03	-1,34E-02
GWP – biogenic	kg CO_2e	-6,55E-03	3,02E-05	-1,12E-01	-1,18E-01	7,30E-05	1,12E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,06E-06	4,19E-01	4,71E-03	-2,30E-02
GWP – LULUC	kg CO_2e	6,09E-04	5,31E-05	5,72E-03	6,38E-03	1,30E-04	5,67E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,05E-05	1,01E-05	3,65E-07	-2,38E-05
Ozone depletion pot.	kg CFC_{-11}e	8,45E-08	3,05E-09	8,94E-06	9,03E-06	7,33E-09	7,28E-11	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,18E-10	7,82E-10	4,87E-11	-2,54E-10
Acidification potential	mol H^+e	3,37E-03	4,71E-04	1,43E-03	5,26E-03	1,15E-03	3,16E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	9,34E-05	3,60E-04	1,63E-05	-7,70E-05
EP-freshwater[2)]	kg Pe	2,13E-04	1,01E-05	1,31E-04	3,54E-04	2,44E-05	1,64E-06	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,04E-06	3,01E-05	2,49E-06	-7,43E-06
EP-marine	kg Ne	5,78E-04	1,58E-04	5,93E-04	1,33E-03	3,88E-04	3,27E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,13E-05	8,04E-04	4,07E-06	-1,23E-05
EP-terrestrial	mol Ne	5,93E-03	1,72E-03	4,29E-03	1,19E-02	4,22E-03	1,10E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,41E-04	1,72E-03	4,38E-05	-1,22E-04
POCP ("smog")[3)]	kg NMVOCe	3,86E-03	7,39E-04	2,02E-03	6,62E-03	1,80E-03	4,02E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,47E-04	4,50E-04	1,59E-05	-4,64E-05
ADP-minerals & metals[4)]	kg Sbe	1,70E-05	5,07E-07	3,02E-06	2,05E-05	1,20E-06	3,65E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,01E-07	9,67E-08	2,51E-09	-2,55E-08
ADP-fossil resources	MJ	1,83E+01	2,15E+00	9,82E+00	3,03E+01	5,17E+00	6,90E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,35E-01	4,25E-01	3,43E-02	-2,57E-01
Water use[5)]	m^3e depr.	2,30E-01	1,05E-02	1,46E-01	3,86E-01	2,54E-02	2,13E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,11E-03	4,93E-02	1,62E-03	-4,27E-03

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	2,59E-08	1,12E-08	1,40E-08	5,11E-08	2,89E-08	1,10E-09	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,13E-09	2,97E-09	2,48E-10	-6,03E-10
Ionizing radiation[6)]	kBq U235e	2,52E-01	3,02E-03	9,97E-02	3,55E-01	6,60E-03	1,96E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,55E-04	7,58E-04	4,32E-05	-3,76E-03
Ecotoxicity (freshwater)	CTUe	3,57E+01	3,00E-01	5,83E+01	9,43E+01	6,79E-01	1,70E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	6,23E-02	2,01E+00	1,83E+00	-2,54E-01
Human toxicity, cancer	CTUh	9,75E-10	2,56E-11	1,29E-09	2,29E-09	6,28E-11	7,51E-12	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,00E-12	1,55E-10	5,83E-13	-2,20E-12
Human tox. non-cancer	CTUh	6,68E-09	1,31E-09	3,81E-09	1,18E-08	3,25E-09	3,48E-10	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,57E-10	5,85E-09	3,65E-11	-8,83E-11
SQP[7)]	-	2,07E+00	1,19E+00	1,23E+01	1,56E+01	3,08E+00	5,67E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	2,30E-01	2,65E-01	8,46E-02	-9,22E-02

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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 disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	8,28E-01	3,98E-02	3,19E+00	4,05E+00	8,94E-02	-2,85E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,43E-03	-9,96E+00	6,58E-04	1,14E-01
Renew. PER as material	MJ	0,00E+00	0,00E+00	2,44E+00	2,44E+00	0,00E+00	-2,44E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,12E-01
Total use of renew. PER	MJ	8,28E-01	3,98E-02	5,62E+00	6,49E+00	8,94E-02	-5,28E+00	ND	ND	ND	ND	ND	ND	ND	0,00E+00	8,43E-03	-9,96E+00	6,58E-04	3,26E-01
Non-re. PER as energy	MJ	1,36E+01	2,15E+00	7,35E+00	2,31E+01	5,17E+00	7,91E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,35E-01	-9,60E+00	3,43E-02	-2,57E-01
Non-re. PER as material	MJ	4,67E+00	0,00E+00	1,19E-01	4,79E+00	0,00E+00	-1,19E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-3,97E+00	-7,00E-01	3,80E-02
Total use of non-re. PER	MJ	1,83E+01	2,15E+00	7,47E+00	2,79E+01	5,17E+00	-1,11E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	4,35E-01	-1,36E+01	-6,66E-01	-2,19E-01
Secondary materials	kg	7,98E-03	9,68E-04	1,36E-01	1,45E-01	2,37E-03	8,99E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,90E-04	3,64E-04	1,10E-05	1,11E-03
Renew. secondary fuels	MJ	2,22E-03	1,11E-05	3,76E-02	3,99E-02	2,99E-05	6,05E-07	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,95E-06	6,75E-06	2,07E-07	1,32E-05
Non-ren. secondary fuels	MJ	5,98E-03	0,00E+00	4,48E-04	6,43E-03	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
Use of net fresh water	m^3	4,98E-03	2,93E-04	5,70E-03	1,10E-02	6,96E-04	-9,10E-05	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,97E-05	6,77E-04	-4,09E-04	-9,87E-05

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	7,21E-02	2,95E-03	2,21E-02	9,71E-02	7,42E-03	9,43E-04	ND	ND	ND	ND	ND	ND	ND	0,00E+00	5,71E-04	4,87E-02	5,43E-05	-7,98E-04
Non-hazardous waste	kg	1,41E+00	6,58E-02	3,14E+00	4,62E+00	1,57E-01	1,21E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,33E-02	1,76E+00	4,82E-01	-5,62E-02
Radioactive waste	kg	3,79E-05	7,54E-07	8,82E-06	4,75E-05	1,64E-06	4,83E-08	ND	ND	ND	ND	ND	ND	ND	0,00E+00	1,64E-07	1,93E-07	1,04E-08	-9,64E-07

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	8,91E-05	0,00E+00	2,53E-06	9,17E-05	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
Materials for recycling	kg	7,03E-04	0,00E+00	9,59E-06	7,13E-04	0,00E+00	1,27E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	1,60E-03	0,00E+00	0,00E+00
Materials for energy rec	kg	1,86E-04	0,00E+00	1,39E-05	2,00E-04	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
Exported energy	MJ	8,79E-05	0,00E+00	3,79E-06	9,17E-05	0,00E+00	1,38E-01	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,78E+00
Exported energy – Electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,78E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-1,26E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,02E-02	ND	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,52E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[9)]	kg CO_2e	7,92E-01	1,53E-01	7,08E-01	1,65E+00	3,68E-01	7,84E-03	ND	ND	ND	ND	ND	ND	ND	0,00E+00	3,12E-02	4,66E-01	1,45E-03	-1,34E-02

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH4 fossil, CH4 biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO2 is set to zero.

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity production, wind, 1-3MW turbine, onshore, Romania, Ecoinvent, 0.0235 kgCO2e/kWh Electricity production, hydro, run-of-river, Romania, Ecoinvent, 0.0044 kgCO2e/kWh Electricity production, photovoltaic, 3kWp slanted-roof installation, single-Si, panel, mounted, Romania, Ecoinvent, 0.0888 kgCO2e/kWh Transformation and transmission losses 9% according to national estimations
Heat production, natural gas	Heat production, natural gas, at boiler atm. low-NOx condensing non-modulating <100kW, Romania, Ecoinvent, 0.0764 kgCO2e/MJ
Diesel	Market for diesel, burned in building machine, World, Ecoinvent, 0.10 kgCO2e/MJ

Transport scenario documentation - A4 (Transport resources)

Scenario parameter	Value
Fuel and vehicle type	EURO5 truck 16-32 ton, diesel 0.25 litri/km
Average transport distance, km	1610 km
Capacity utilization (including empty return) %	85%
Bulk density of transported products (kg/m³)	1,48E+02
Volume capacity utilization factor	<1

Installation scenario documentation - A5 (Installation waste)

Scenario information	Value			
Waste materials on the building site before waste processing, generated by the product's installation (specified by type) / kg	Wood packaging	0.050		
	Plastic packaging	0.00151		
	Paper/Cardboard packaging	0.133		
Output materials as result of waste processing at the building site		Wood packaging	Plastic packaging	Paper packaging
	Recycling	0.016	0.0006	0.110
	Energy recovery	0.015	0.00056	0.011
	Disposal	0.019	0.00035	0.012
Direct emissions to ambient air, soil and water / kg	0			

End of Life – Scenario documentation – C1-C4

Scenario information	Value
Collection process – kg collected separately	0.0016
Collection process – kg collected with mixed waste	0.9904
Recovery process – kg for re-use	0
Recovery process – kg for recycling	0.0016
Recovery process – kg for energy recovery	0.8415
Disposal (total) – kg for final deposition	0.1489

Scenario assumptions:
Waste processing scenario based on 85% incineration with energy recovery and 15% inert waste landfill. Average transport to waste processing: 50 km by 7.5-16t truck (Euro 5). Energy recovery efficiency: 20% for electricity and 40% for thermal energy.

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez
Tool verification validity: 27 March 2025 - 26 March 2028

Vera Durão, as an authorised verifier acting for EPD Hub Limited

13.02.2026