CONMIX

NON-SHRINK GROUTS

ENVIRONMENTAL PRODUCT DECLARATION

NANOGROUT EG

In accordance with ISO 14025 & EN 15804:2012+A2:2019/AC:2021

EPD Program	Title	Details
International Climate Intelligence System 71-75 Shelton Street Covent Garden, London, WC2H 9JQ United Kingdom office@climateintell.com	Registration Number	ICIS-202603-119
	Publication Date	25-03-2026
	Validity	24-03-2031
	Revision Date	N/A

INTERNATIONAL CLIMATE EPD VERIFIED INTELLIGENCE SYSTEM

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INTERNATIONAL CLIMATE INTELLIGENCE SYSTEM EPD

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Leading the Middle East, Conmix
delivers innovative concrete and
plaster solutions.

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OVERVIEW

This Environmental Product Declaration (EPD) presents verified, transparent environmental performance data for NanoGrout EG, manufactured by Conmix Ltd. at its facility in Sharjah, United Arab Emirates, for the reporting period August 2024 to July 2025. The declared unit for this assessment is 1 kg of NanoGrout EG.

The LCA follows the requirements of ISO 14025 and EN 15804:2012 + A2:2019/AC:2021, covering all relevant life cycle stages within the defined system boundary. This EPD enables architects, engineers, contractors, and sustainability consultants to make informed material choices by providing consistent, third-party-verified environmental information suitable for certification schemes, embodied-carbon reporting, and procurement transparency.

PRODUCT INFORMATION

Product Name

NanoGrout EG

Product Type

High Strength Epoxy Resin Grout

Declared Unit

1 kilogram

PCR & Version

ICIS PCR 2026:18 v1.2.6 (EN 15804 + A2 aligned)

Scope

Cradle-to-Gate with options (A1-A4, C1-D)

Production Route

Epoxy-based grouting system formulation

Recycled Content

Not intentionally added (inherent recycled content only)

Electricity Mix

UAE grid mix from Ecoinvent 3.11 (cut-off). Natural Gas (89.42%), Nuclear (7.06%), Oil (0.60%), Solar (0.18%) and others.

LCA Tool and Database

Air.e.LCA v3.20.1.0 and Ecoinvent v3.11 (Cut-Off)

Geographical Scope

United Arab Emirates

PRODUCT INFORMATION

Verification

International Climate Intelligence System
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Product Group Classification

UN CPC 3744 (Cement mortars & grouts)

Environmental Performance Summary (A1-A3)

Indicator	Result	Unit
Climate change (GWP) - total	1.33E+00	Kg CO_2e
Climate change (GWP) - fossil	1.26E+00	Kg CO_2e
Ozone Depletion (ODP)	3.56E-08	Kg CFC-11e
Abiotic depletion of fossil resources	1.98E+01	MJ

Hotspot Summary

Process	Share of Total GWP (%)
Raw Material Supply (A1)	88.93
Raw Material Transportation (A2)	0.19
Manufacturing (A3)	8.70
Remaining Modules (A4, C1-C4)	2.18

PRODUCT INFORMATION

Where This Adds Value

Scheme / Area	Relevance to NanoGrout EG
LEED v4.1 (USGBC) – MR Credit: EPDs (aligned with emerging LEED v5 requirements)	The Type III EPD for NanoGrout EG supports Material Disclosure credits and whole-building embodied carbon accounting. EG is typically used for precision grouting of machinery bases, anchor bolts, and base plates in LEED-driven industrial and infrastructure projects in the UAE and KSA.
Estidama Pearl Rating System (Abu Dhabi)	Provides verified environmental data supporting material transparency pathways. NanoGrout EG is commonly specified in Pearl-rated projects for heavy-duty equipment foundations, anchoring works, and areas requiring high load transfer and chemical resistance.
GSAS (Qatar)	Supports GSAS material submittals requiring quantified environmental performance data. EG's documented cradle-to-gate impacts enable comparison and approval of epoxy-based grouting materials used in industrial and infrastructure applications.
BREEAM (UK/UAE Adaptations)	The EPD contributes to MAT 01 and MAT 02 credits related to whole-building LCA and responsible material specification. NanoGrout EG is relevant for infrastructure, energy, and industrial projects requiring documented epoxy grout impacts.
Whole-Building LCA Tools	The cradle-to-gate with options LCA model for NanoGrout EG integrates into digital LCA tools for GCC projects. It enables accurate modelling of epoxy grouts used in machinery foundations, base plates, and structural anchoring systems.

PRODUCT INFORMATION

Government & Giga-Project Requirements	Major clients such as NEOM, Red Sea Global, Diriyah Gate, and ADNOC request verified product-specific EPDs for material pre-qualification. NanoGrout EG's EPD supports acceptance of epoxy grouting systems in critical structural and industrial packages.
Procurement Transparency (GCC Contractors)	Supports sustainability submissions for contractors and consultants requiring environmental declarations for epoxy grouts used in heavy-duty anchoring, vibration-prone installations, and chemically demanding service conditions.

ABOUT CONMIX

Founded in 1975, Conmix Ltd. is one of the UAE's longest-established manufacturers of construction materials and has grown into a leading producer of ready-mix concrete, pre-mix plasters, mortars, grouts, coatings, and construction chemicals in the Middle East. Strategically headquartered in Sharjah, the company has supported regional infrastructure development for decades through its extensive range of high-performance, quality-certified products.

Conmix operates a fully integrated manufacturing network with multiple production facilities across the UAE, covering ready-mix concrete, dry-mix plasters, grouts, repair mortars, waterproofing systems, and specialty construction chemicals. Its products are supplied to major building and infrastructure projects across the GCC, Asia, and Africa.

The company's operations are supported by a skilled workforce of over 1,000 personnel, including engineers, lab technicians, QC specialists, production experts, and technical support teams.

Conmix promotes a culture of innovation, operational excellence, and customer service, with dedicated teams overseeing formulation development, sustainability initiatives, and project-specific technical support.

Conmix maintains a comprehensive portfolio, including:

- ISO 9001:2015 – Quality Management System
- ISO 14001:2015 – Environmental Management System
- ISO 45001:2018 – Occupational Health & Safety
- Dubai Central Laboratory (DCL) product conformity certifications covering plasters, grouts, and repair systems
- BS, ASTM, EN, and DIN compliance across multiple dry-mix and chemical product categories
- CE Marking for selected product lines exported to international markets

Conmix continues to enhance its manufacturing capabilities and quality systems to meet the evolving requirements of large-scale construction and infrastructure projects across the region.

PRODUCT DESCRIPTION

NanoGrout EG is a high-performance, free-flowing, non-shrink, epoxy-based grout formulated for precision structural grouting and heavy-duty load transfer applications. Supplied as a multi-component system, it is mixed on site to produce a dense, cohesive grout with excellent flow characteristics, rapid strength development, and strong adhesion to concrete and steel substrates. Its formulation combines epoxy resin, reactive hardeners, mineral fillers, and modifiers that provide controlled rheology, low permeability, and dimensional stability without reliance on water.

The grout is designed for demanding construction and industrial applications where high mechanical strength, vibration resistance, and chemical durability are essential. NanoGrout EG develops very high early and long-term strength, exhibits negligible shrinkage, and maintains performance under dynamic and restrained conditions. Typical uses include grouting machinery bases, anchor bolts, base plates, rail fixings, and structural voids subjected to high loads. The product is supplied in pre-measured 10 litre and 20 litre sets, providing flexibility for both precision installations and large-scale industrial grouting requirements.

Sectors & Corresponding Uses

Sector	Application / Use Case
Industrial & Plant Installations	Precision grouting of machinery bases, base plates, and anchor bolts for accurate alignment, load transfer, and vibration resistance
Structural Steel & Anchoring Works	Securing anchor bolts and base plate connections requiring high strength and chemical resistance
Repair & Strengthening	Reinstating anchorage zones, restoring bolt pockets, and filling high-stress structural voids
Infrastructure & Transport Projects	Grouting rail fixings, bridge bearings, and connections exposed to dynamic loads and harsh conditions
Energy & Heavy-Duty Facilities	Durable grouting of equipment foundations, supports, and embedded components in power, oil, and industrial facilities

Technical Specifications

Parameter	Details / Specification
Form	Multi-component, free-flowing epoxy grout system

PRODUCT DESCRIPTION

Mixing Method	On-site mixing of supplied components to achieve uniform consistency
Component	Three: Part A - Base, Part B - Hardener, Part C - Filler
Colour	Black when mixed
Compressive Strength	1 Day - 65 N/mm^2, 7 Days - 95 N/mm^2 (ASTM C 579 / BS 6319 - 2)
Flexural Strength	7 Days - 30 N/mm^2 (BS EN 196 - 1 / BS 6319 - 3)
Tensile Strength	7 Days - >15 N/mm^2 (ASTM C307)
Pot Life	45 mins (2 kg Mixed Material)
Effective Bearing Area	> 85% (ASTM C1339)
Pack Size	10 litre and 20 litre pre-measured sets
Yield	Approx. 10–20 litres per set (as supplied)
Application Method	Pouring or gravity placement into machinery bases, base plates, anchor bolts, rail fixings, and structural voids requiring high load transfer

MANUFACTURING DETAILS

The production of NanoGrout EG at Conmix begins with material inspection of key raw materials, primarily epoxy resins, reactive hardeners, mineral fillers, and performance modifiers that control flow, strength, and durability. All incoming materials undergo quality verification to ensure conformity with internal specifications before being transferred to dedicated storage areas, sealed containers, or controlled environments based on chemical sensitivity and handling requirements.

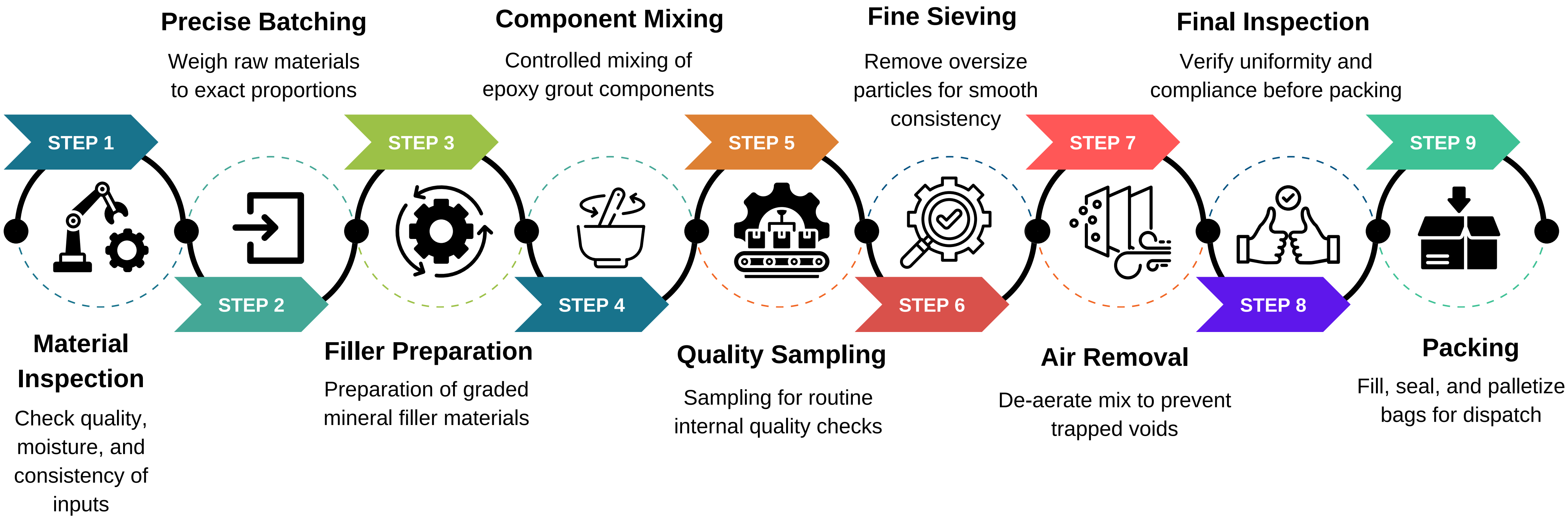
During precise batching, each component is measured accurately through controlled dosing procedures to ensure correct formulation and stoichiometry. Filler preparation and component mixing are carried out under controlled conditions to maintain homogeneity and stability of the epoxy grout system. This processing stage ensures uniform distribution of fillers and additives and contributes to EG's high strength, flowability, and dimensional stability after curing. Chemical curing reactions occur only after site mixing; no curing takes place during manufacturing.

Following component preparation, fine sieving removes oversized particles and supports smooth flow characteristics. Air removal is achieved through controlled handling to minimise entrapped air and support consistent density and performance. Quality sampling and checks—including viscosity, density, and visual inspection—are performed on each batch to ensure compliance with EG's technical datasheet requirements. Conforming batches undergo final inspection before packaging into rigid plastic containers, batch-coded, palletised, wrapped, and prepared for dispatch from the Sharjah manufacturing facility.

For a visual representation of the full manufacturing workflow, refer to the illustrated flow chart on the next page. A screenshot of the process flow as modeled in the LCA software is provided on the page that follows.

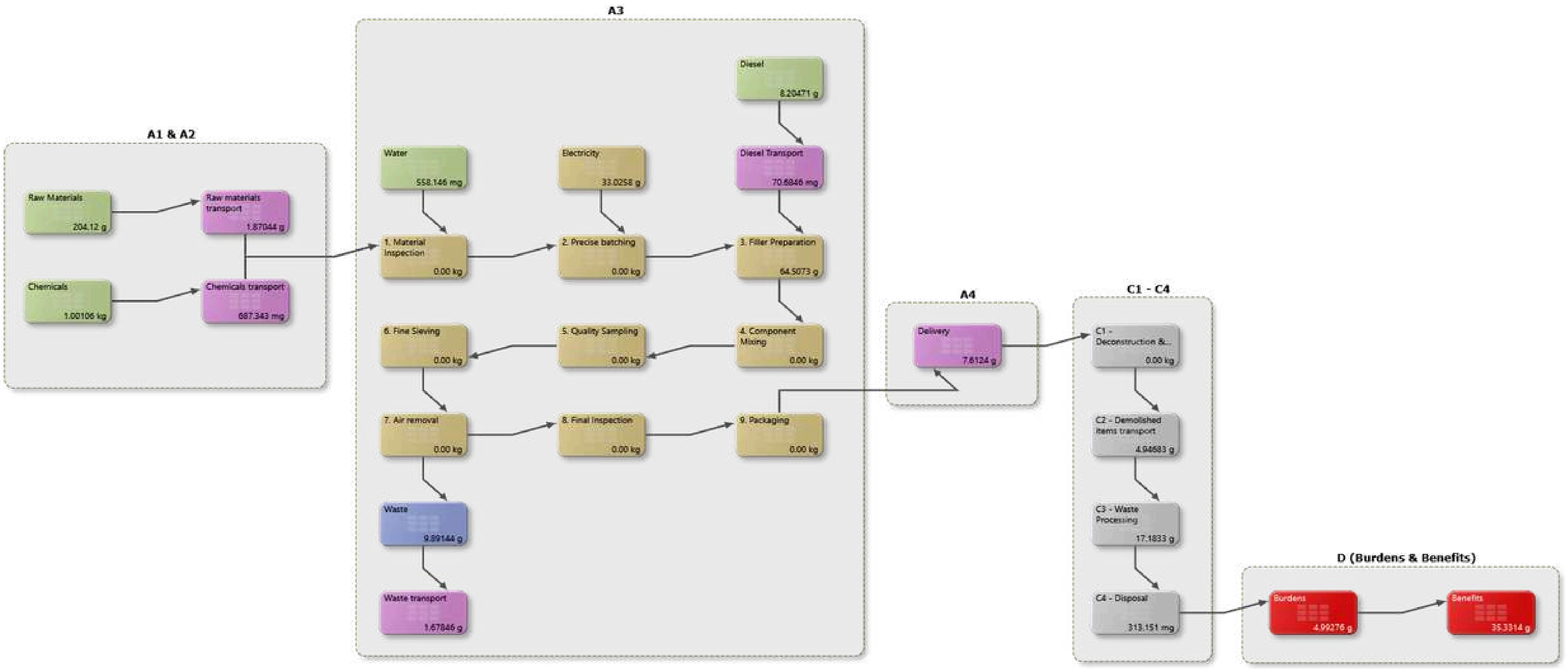
MANUFACTURING DETAILS

Schematic overview of NanoGrout EG manufacturing process



MANUFACTURING DETAILS

Screenshot of NanoGrout EG LCA model from LCA software



CONTENT DECLARATION

The content declaration provides a transparent breakdown of all raw materials used in the formulation of NanoGrout EG, expressed per 1 kg of product. The formulation is primarily composed of finely graded Quartz Sand, Epoxy Resin, Ordinary Portland Cement (OPC), Baryte, and reactive hardeners, supported by small quantities of superplasticizers and performance-enhancing additives that provide flow retention, stability, and non-shrink characteristics. The total of all listed components equals 1 kg, matching the declared unit and ensuring complete material accounting in line with EN 15804 and ISO 14025 requirements.

Component	Weight (kg/Declared unit)	Post-consumer recycled (%)	Pre-consumer recycled (%)	Biogenic Content (%)	Biogenic Carbon (kg C/DU)
Quartz Sand	0.53	0	0	0	0
Epoxy Resin	0.14	0	0	0	0
OPC	0.13	0	0	0	0
Barite	0.07	0	0	0	0
Additives & Fillers	0.13	0	0	0	0
Total	**1**	**0**	**0**	**0**	**0**

Substances of Very High Concern (SVHC)

According to the requirements of the ECHA Candidate List, NanoGrout EG contains no substances of very high concern (SVHCs) above the 0.1% (w/w) threshold in the final product or its ancillary materials.

All raw materials used in the formulation—Quartz Sand, Epoxy Resin, Ordinary Portland Cement (OPC), Baryte, and reactive hardeners—were reviewed against the latest published SVHC list at the time of reporting. Based on manufacturer declarations and available safety data, no SVHCs are present.

Packaging Material Declaration

Packaging materials used for NanoGrout EG include wooden pallets, HDPE containers, and LDPE stretch wrap. These materials serve distinct functions within the product supply chain—wooden pallets provide structural stability during handling and transport, HDPE containers securely contain the grout components during storage, and LDPE stretch wrap stabilises pallet loads and protects from moisture. All packaging components are included in the life cycle assessment because they contribute to upstream manufacturing impacts and generate recoverable material streams at end-of-life.

CONTENT DECLARATION

Packaging Material	Biogenic Content (%)	Biogenic Carbon Fraction (kg C/kg material)	Notes & References
Wooden Pallet	~100% biogenic (solid wood)	0.50 kg C per kg wood (approx. 50% of dry mass is carbon)	Wood carbon fraction widely documented in forestry & IPCC (2006) guidelines — wood contains 50% carbon by dry weight
HDPE Containers	0% biogenic	0 kg C/kg	Petroleum-based plastic (polyethylene); contains no biogenic carbon
LDPE Liners	0% biogenic	0 kg C/kg	Petroleum-based plastic film; contains no biogenic carbon

Wood contains significant biogenic carbon because it originates from biomass; HDPE and LDPE do not. These biogenic fractions are reported for transparency and to reflect the renewable carbon temporarily stored in packaging materials. Their treatment in the LCA model follows EN 15804+A2 guidance, with flows presented in the Packaging Composition and Biogenic Carbon table below.

Packaging Material	Weight (kg/Declared Unit)	Share of Packaging (%)	Biogenic Carbon (kg C/DU)	End-of-Life Handling
Wooden Pallet	1.25E-03	4.67	6.26E-04	Reuse / Recycle / Energy Recovery
HDPE Containers	2.40E-02	89.72	0.00E+00	Recycle / Energy Recovery
LDPE Stretch Wrap	1.50E-03	5.61	0.00E+00	Recycle / Energy Recovery
Total	**2.68E-02**	**100**	**6.26E-04**	**-**
Note - Biogenic content in packaging materials is **below the 5% threshold** of total packaging weight as stated in **ICIS PCR 2026:18**. Therefore, **no biogenic carbon balancing is applied between module A3 and module A5**.				

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Declared Unit

The declared unit for this EPD is 1 kg of NanoGrout EG at the factory gate. All material inputs, energy use, emissions, transportation, packaging, and end-of-life modelling are quantified relative to this unit. This ensures consistent comparison across life cycle stages and aligns with EN 15804+A2 requirements for construction products. No functional performance is assigned to the product in this declaration, as the EPD is based on a declared unit rather than a functional unit.

Temporal, Geographical and Technological Representativeness

Temporal Representativeness: Primary data for NanoGrout EG reflects the reporting period August 2024 to July 2025, in line with EN 15804+A2 requirements that primary manufacturing data must be no older than five years. All on-site information—including raw material consumption, energy use, water use, and waste generation—represents current operational conditions at the Sharjah plant during the defined reporting year. Background data used in the study are consistent with the temporal validity provided in their respective datasets to ensure alignment with the modelling year.

Geographical Representativeness: The LCA model for NanoGrout EG reflects the actual manufacturing and supply conditions of Conmix Ltd.'s Sharjah facility in the United Arab Emirates, where all primary data was collected. The study represents production and operations within UAE, with UAE-specific or GCC-specific conditions applied wherever available — particularly for raw material sourcing patterns, electricity grid characteristics, water production, and end-of-life treatment routes.

Where UAE-specific datasets or regional factors were not available, GCC-appropriate or globally representative datasets were used. All transport distances, energy consumption figures, and end-of-life scenarios are based on realistic UAE and GCC practice, ensuring geographical relevance of the final results.

Technological Representativeness: The manufacturing process modelled for NanoGrout EG accurately reflects the actual production technology used at Conmix Ltd.'s Sharjah facility. The product is produced through controlled batching, filler preparation, and formulation processes, incorporating finely graded quartz sand, epoxy resin, Ordinary Portland Cement (OPC), baryte, and reactive hardeners using industrial mixing equipment, dosing systems, and automated sieving. No curing or polymerisation reactions occur during manufacturing, and no heating or wet processing steps are applied. The technological assumptions used in the LCA are therefore representative of real operations at the plant, ensuring that the results reflect site-specific production conditions.

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LCA Software and Database

The life cycle model for NanoGrout EG was developed using Air.e.LCA v3.20.1.0, with all background inventory data sourced from Ecoinvent v3.11 (Allocation, cut-off by classification). The software was used to structure process flows, assign datasets, calculate environmental indicators, and perform all module-by-module inventory tracking. The database provides consistent, peer-reviewed life cycle inventories for raw materials, energy supply, transportation, and waste management processes. All datasets selected reflect technologies and supply chains relevant to the product and regional context, ensuring reliable integration of foreground data with established international life cycle inventories.

System Boundary

This EPD covers all product stages from “cradle to gate with options”, i.e. this LCA covers Production stage A1-A3, Transportation A4, End-of-life stages C1-C4 and Resource recovery stage D according to EN 15804:2012 + A2:2019 / AC:2021.

The procedures that are not controlled by the company, but are included in this environmental study, are:

- The extraction and production of fuels and electricity.

All related direct and indirect environmental impacts related to these elements have been calculated and were included in the LCA and this EPD. Personnel-related processes, such as transportation of employees to and from work is excluded. Also, the production and end-of-life processes of infrastructure or capital goods used in the product system are excluded.

Module A1 - Raw Material Supply

Module A1 encompasses all upstream processes related to the sourcing and preparation of raw materials used in the manufacture of NanoGrout EG. The primary constituents—finely graded quartz sand, epoxy resin, and Ordinary Portland Cement (OPC)—are procured from established suppliers within the United Arab Emirates, ensuring reliable quality, consistent grading, and compatibility with local construction project requirements. Additional components such as mineral fillers, hydrated lime, reactive hardeners, diluents, and other performance additives are likewise sourced fully from UAE-based suppliers according to technical specifications and availability. All upstream activities such as raw material extraction, intermediate processing, and packaging of inputs are included within this module.

Module A2 - Raw Material Transportation

Module A2 covers the transportation of all raw materials from their respective suppliers to the Conmix manufacturing facility in Sharjah, United Arab Emirates. Key inputs—including finely graded quartz sand, epoxy resin, Ordinary Portland Cement (OPC), mineral fillers, hydrated lime, and performance additives—are sourced from suppliers within the UAE, reflecting a fully localised supply chain for NanoGrout EG. All inbound movements are modelled using >32-ton Euro 6–equivalent road transport, representing typical logistics for bulk mineral inputs, bagged powders, and palletized chemical components. The environmental impacts in this stage arise from fuel consumption, tailpipe emissions, and transport distances associated with the delivery of each material. Load efficiencies and realistic supplier-to-plant distances used in the LCA model reflect actual UAE logistics conditions and are applied consistently across all raw materials in the product system.

Module A3 - Manufacturing

Manufacturing impacts cover all processes required to convert raw materials into the finished NanoGrout EG product at the Conmix facility in Sharjah. Production follows a controlled formulation workflow comprising nine sequential steps: Material Inspection, Precise Batching, Filler Preparation, Component Mixing, Quality Sampling, Fine Sieving, Air Removal, Final Inspection, and Packing. Each stage ensures accurate dosing, uniform dispersion of fillers and additives, consistent batch quality, and compliance with internal technical specifications.

Environmental loads in this module include electricity use for mixing, sieving, and material handling; fuel use from internal forklift movement; water used for equipment wash-down; and solid waste generated during fine sieving (primarily inert mineral residues). Wastewater from cleaning operations is directed to appropriate treatment. This module also accounts for all ancillary inputs used on-site, including packaging materials (HDPE containers, LDPE stretch wrap, and wooden pallets). All emissions from equipment operation, internal transport, dust handling, and waste processing are included within the A3 boundary.

Module A4 - Delivery

Module A4 accounts for the transportation of finished NanoGrout EG from the Conmix manufacturing facility in Sharjah to customer locations. As NanoGrout EG is supplied exclusively within the United Arab Emirates, outbound transport is modelled using domestic road freight routes consistent with typical UAE distribution corridors. Road deliveries are modelled using Euro 6, >32-ton trucks consistent with Ecoinvent v3.11 cut-off system model assumptions, reflecting typical heavy-duty vehicles used for palletised construction chemical products in the region.

Packaged in rigid containers and palletised for shipment, the product is transported as consolidated loads with full capacity utilisation. Transport distances are based on representative average delivery routes within the UAE, covering distribution to construction sites, contractors, industrial facilities, and infrastructure projects across the emirates. Environmental impacts in this

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module include diesel consumption, tailpipe emissions, and load-dependent fuel use associated with outbound domestic deliveries.

Scenario details	Description
Vehicle used for transport	Euro 6, >32 ton truck
Vehicle capacity	>32 tons
Fuel type and consumption	Diesel, 0.38 liters per km
Capacity utilization	100% as assumed in Ecoinvent v3.11
Bulk transportation	Mass of the transported product

Module C1 - Deconstruction and Demolition

Module C1 addresses the environmental impacts associated with deconstruction or demolition of the product at end-of-life. NanoGrout EG is applied in voids, ducts, joints, or anchor zones where it cures and becomes fully bonded within the surrounding concrete. Once cured, it no longer exists as a separate layer or component that can be removed on its own.

During end-of-life demolition, the entire concrete element is broken using standard demolition equipment (e.g., hydraulic breakers or crushers). The grout simply follows the same mechanical breakup as the concrete around it. No additional time, tools, fuel, or handling effort is required specifically for the grout.

For example, if a beam or slab containing grout is demolished, the contractor does not identify, target, or treat the grout differently; the teardown process remains unchanged whether the grout is present or not. This means the presence of NanoGrout EG does not influence the demolition method or increase the resources consumed during deconstruction.

Because no distinct or measurable demolition activities are attributable to NanoGrout EG alone, the environmental burdens in Module C1 are considered zero.

Module C2 - Transport to Waste Processing

Module C2 covers the transport of end-of-life material from the demolition site to waste management facilities. After demolition, NanoGrout EG becomes part of the mixed mineral rubble generated from breaking concrete elements. Since the product is supplied and used exclusively within the UAE, the demolition waste remains entirely within the national waste management system, which is characterised by high diversion rates for concrete and masonry rubble.

Across the UAE, construction-and-demolition (C&D) recycling facilities operated by Dubai Municipality, Tadweer (Abu Dhabi), BEEAH (Sharjah), and other emirates typically achieve diversion rates between 90% and 97%, driven by regulatory requirements and the strong demand for recycled aggregate in infrastructure works. These values are consistent with performance observed in countries with advanced C&D recycling systems—such as the Netherlands, Denmark, Belgium, Japan, and Singapore—which frequently achieve recovery rates in the 90–99% range. These international rates are included for context only; the modelling relies solely on UAE-specific practices.

Reflecting the UAE’s established recycling performance, 95% of the mixed demolition rubble containing NanoGrout EG is assumed to be transported to a C&D recycling facility, while the remaining 5% is sent directly to an inert landfill due to contamination, sorting limitations, or unsuitable loads. A one-way distance of 50 km is assumed for both routes, representing typical transport distances between demolition sites and authorised facilities within the UAE. Transport is modelled using a >32-ton EURO 6 lorry commonly used for bulk mineral waste transport in the region.

Module C2 therefore includes only the emissions associated with transporting the mixed demolition rubble to the respective recycling and landfill sites within the UAE.

Type	Capacity utilization	Type of vehicle	Average distance
Truck	92%	Euro 6, >32 ton truck	50 kms

Module C3 - Waste Processing

Module C3 covers the processing of demolition rubble that enters recycling. Once NanoGrout EG is demolished together with the concrete element, it forms part of the mixed mineral waste stream typically comprising concrete, masonry, mortar, and similar construction materials. Since the product is used only within the UAE, the recycled fraction is routed through local C&D recycling facilities such as those operated by Dubai Municipality, Tadweer, BEEAH, and private-sector operators across the emirates.

At these facilities, processing normally begins with coarse sorting to remove oversized fragments and contaminants, followed by primary crushing of the rubble. Magnetic separation extracts reinforcing steel, which is diverted for metal recycling. The mineral fraction is then subjected to secondary crushing and multi-stage screening to produce graded recycled aggregates and fines. These mechanical processes do not require any special treatment for NanoGrout EG, as the hardened epoxy grout behaves similarly to concrete during crushing.

Recycled aggregates produced in UAE plants are widely used for road base, sub-base, utility trench bedding, backfilling, embankments, footpath layers, and landscaping fill, supporting the country's circular economy targets. These uses align with applications seen internationally in regions with advanced C&D recycling practices such as the Netherlands, Denmark, Belgium, Japan, and Singapore. International examples are provided for context only; modelling assumptions remain fully UAE-centric.

Module C3 therefore includes the environmental burdens associated with crushing, sorting, and screening the 95% of mixed mineral demolition waste containing NanoGrout EG that is directed to recycling. Material that cannot be recovered proceeds to Module C4 for disposal.

Module C4 - Disposal

Module C4 covers the disposal of the portion of demolition waste that does not enter the recycling route. For NanoGrout EG, 5% of the mixed mineral rubble is assumed to be sent directly from the demolition site to an inert construction-and-demolition (C&D) landfill within the UAE. This assumption reflects the country's well-established system where most of the concrete and masonry rubble is directed to C&D recycling plants, while only a small contaminated or non-recoverable portion is disposed of.

The disposed material consists entirely of inert mineral waste derived from broken concrete containing the hardened epoxy grout. These materials do not generate landfill gas, do not biodegrade, and exhibit extremely low chemical reactivity. In inert landfill operations, any leachate from such mineral fractions is typically negligible, and landfill management focuses mainly on placement, spreading, compaction, and dust suppression.

UAE C&D landfills operate as engineered inert disposal sites managed under municipal waste regulations, with similar operational practices to inert landfills used internationally. Module C4 therefore includes only the operational burdens associated with the disposal of this 5% non-recycled mineral fraction, while the remaining 95% is handled in Module C3 and contributes to recovery benefits in Module D.

Module C4 therefore includes only the operational burdens associated with the disposal of this 5% non-recycled mineral fraction. The remaining 95% of the material is processed through recycling in Module C3 and contributes to recovery outcomes in Module D.

Module D - Reuse, Recovery & Recycling Potential

Module D reports the net environmental burdens and benefits associated with the recovery of materials that leave the system boundary at end-of-life. Since NanoGrout EG becomes part of the concrete element in service, its contributions in Module D arise solely from the recovery of mixed mineral demolition rubble and the recovery of packaging materials.

At end-of-life, 95% of the mineral rubble containing NanoGrout EG is processed at a UAE C&D recycling facility, where it is crushed into recycled aggregate that substitutes virgin crushed gravel on a 1:1 mass basis. This reflects actual performance in the UAE, where government-regulated C&D recycling plants commonly divert most concrete waste into recycled aggregate used for road sub-base, backfilling, trench bedding, landscaping layers, and infrastructure works. These recovery outcomes are consistent with international benchmarks from regions with mature recycling systems such as the Netherlands, Denmark, Belgium, Japan, and Singapore.

Packaging materials also contribute to Module D. Wooden pallets are modelled with a 95% recovery rate, supported by the Landfill Avoidance Study (Virginia Tech & USDA Forest Service, 2018), which found that approximately 95% of pallets are reused, repaired, or recovered for energy. HDPE packaging is assigned a 95% recycling rate, reflecting the high recovery performance of rigid industrial plastic packaging reported by PlasticsEurope and supported by European Commission circular economy guidance for source-separated commercial plastics. LDPE stretch wrap is similarly modelled with a 95% recycling rate, consistent with recycling performance reported for clean industrial film streams by organisations such as WRAP (UK) and plastics recycling industry sources.

Module D therefore includes the additional burdens associated with the recycling or treatment of these recovered materials, along with the avoided impacts of substituting virgin crushed aggregate, virgin HDPE, virgin LDPE, and recovered wood products. The results represent the net combined effect of these burdens and benefits.

Process	Unit (kg)
Collection process specified by type	
NanoGrout EG in concrete collected as mixed construction waste	1
Recovery system specified by type	
Mineral demolition rubble sent for reuse / recycling as aggregate	0.95 (95%)
Mineral demolition rubble sent for energy recovery	Not applicable
Disposal specified by type	
Mineral demolition rubble sent to inert landfill	0.05 (5%)
Transportation assumptions	
Transport to recycling and landfill sites	50 km transport by Euro 6, >32 ton truck

LCA KNOWLEDGE

System Boundaries Illustration

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction / installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction & Demolition	Transport	Waste Processing	Disposal	Reuse, Recovery & Recycling potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules Declared	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	UAE	UAE	UAE	UAE	-	-	-	-	-	-	-	-	UAE	UAE	UAE	UAE	UAE
Share of specific data	GWP > 90%			-		-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	0%			-		-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%			-		-	-	-	-	-	-	-	-	-	-	-	-

X - Included, ND - Modules not declared.

LCA KNOWLEDGE

Cut-Off Rules

All relevant material and energy flows contributing to the manufacture of NanoGrout EG have been included in the LCA model. More than 99% of the total mass, energy use, and environmental relevance is captured. Negligible flows—those that do not influence the overall results—are excluded.

The Polluter Pays Principle and the Modularity Principle are applied to ensure that impacts are assigned to the processes where they occur and that each life cycle stage is reported independently. No known data gaps or exclusions are expected to influence the robustness of the results.

Allocation

Allocation was applied only where shared inputs were used across multiple product lines. Electricity consumption, water use, diesel for internal handling, and non-hazardous waste generation were allocated using a mass-based approach, reflecting each product's proportional share of total annual production at the Sharjah facility.

Raw materials, admixtures, additives, and all associated transport flows were modelled using product-specific primary data, as these inputs are dosed exclusively for NanoGrout EG and do not require allocation. No economic allocation was needed, as the plant does not generate co-products during manufacturing.

Electricity

Electricity consumption in the LCA model is based on the UAE grid mix as represented in Ecoinvent v3.11 (Allocation, cut-off by classification). The UAE electricity supply is predominantly generated from natural gas, supplemented by nuclear power, oil, solar energy, and minor imports from neighbouring GCC countries. The modelled grid composition is as follows:

Energy Source	Share (%)
Natural Gas - Combined Cycle Power Plant	51.31%
Natural Gas - Conventional Power Plant	38.11%
Nuclear - Pressure Water Reactor	7.06%
Hard Coal	2.09%

Oil	0.60%
Import from Saudi Arabia	0.44%
Import from Oman	0.20%
Solar Thermal (Parabolic Trough)	0.18%
Wind (<1 MW, Onshore)	0.00003%

The climate impact associated with this electricity mix is 5.81E-01 kg CO_2e per kWh, and this factor is applied consistently to all electricity use across modules A1–A3 and relevant downstream stages. This approach ensures that electricity-related impacts accurately reflect UAE operational conditions and the energy landscape relevant to Conmix's Sharjah facility.

Calculation Rules

The LCA model for NanoGrout EG uses foreground data collected directly from Conmix's Sharjah manufacturing facility, combined with background datasets sourced from Ecoinvent v3.11 (Allocation, cut-off by classification). These datasets provide emission factors for all major inputs, including cement, additives, packaging materials, fuel production, electricity generation, and transportation. UAE-specific conditions—such as regional electricity mix, local supplier distances, and national end-of-life practices—were incorporated wherever applicable to improve representativeness.

All transport activities related to raw material supply and finished product delivery are included, based on actual supplier-to-plant and plant-to-customer road distances within the UAE. Distances were measured using Google Maps to reflect realistic logistics routes. Exclusions are limited to items with negligible relevance (typically <1%), such as administrative activities, office utilities, and maintenance of capital equipment. No maritime transport is involved, as the product is transported by road only.

Byproducts Assignment

No by-products are generated during the manufacturing of NanoGrout EG. The production process involves controlled batching, formulation, and preparation of epoxy grout components, with no secondary materials or co-products formed at any stage. The only outputs are the packaged finished product and normal manufacturing residues (treated as waste). Since no co-products are generated, allocation for by-products is not required.

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ENVIRONMENTAL PERFORMANCE

In the following tables, the environmental performance of the declared unit “1 kilogram of NanoGrout EG” is presented for Conmix Ltd. Environmental impacts are calculated using EF-3.1, (ILCD).

ENVIRONMENTAL PERFORMANCE

Core Environmental impact indicators

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

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Climate change (GWP) - fossil	Kg CO_2e	1.14E+00	2.56E-03	1.17E-01	1.26E+00	7.12E-03	0.00E+00	4.94E-03	1.71E-02	3.13E-04	-2.90E-02
Climate change (GWP) - biogenic	Kg CO_2e	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
Climate change (GWP) - LULUC	Kg CO_2e	5.86E-02	1.23E-06	3.11E-05	5.86E-02	3.42E-06	0.00E+00	2.38E-06	2.44E-05	1.78E-07	-5.39E-03
Climate change (GWP) - total	Kg CO_2e	1.21E+00	2.56E-03	1.18E-01	1.33E+00	7.13E-03	0.00E+00	4.95E-03	1.72E-02	3.13E-04	-3.03E-02
Ozone depletion	Kg CFC-11e	3.11E-08	3.00E-11	4.53E-09	3.56E-08	1.00E-10	0.00E+00	7.00E-11	2.70E-10	8.71E-12	2.89E-06
Acidification	mol H+e	4.81E-03	6.06E-06	9.10E-04	5.73E-03	2.00E-05	0.00E+00	1.00E-05	1.30E-04	2.19E-06	-1.69E-04
Eutrophication, aquatic freshwater	kg PO_4^{3-} eq	8.26E-04	5.98E-07	2.75E-05	8.54E-04	1.67E-06	0.00E+00	1.17E-06	2.54E-05	8.41E-08	-2.87E-05
Eutrophication, aquatic freshwater	Kg P eq	2.69E-04	1.95E-07	8.95E-06	2.78E-04	5.43E-07	0.00E+00	3.80E-07	8.28E-06	2.74E-08	-9.34E-06
Eutrophication, aquatic marine	Kg N eq	1.92E-03	1.62E-06	4.69E-04	2.39E-03	4.51E-06	0.00E+00	3.13E-06	4.66E-05	8.44E-07	-4.50E-05
Eutrophication, terrestrial	mol N eq	1.12E-02	2.00E-05	4.09E-03	1.53E-02	5.00E-05	0.00E+00	3.00E-05	5.00E-04	9.19E-06	-4.76E-04
Photochemical ozone formation	Kg NMVOC eq	4.09E-03	9.64E-06	1.26E-03	5.36E-03	2.69E-05	0.00E+00	1.86E-05	1.61E-04	3.32E-06	-1.63E-04
Abiotic depletion, minerals & metals	Kg Sb eq	8.41E-06	7.64E-09	3.19E-07	8.74E-06	2.13E-08	0.00E+00	1.48E-08	3.89E-08	4.60E-10	-1.83E-07
Abiotic depletion of fossil resources	MJ	1.79E+01	3.49E-02	1.92E+00	1.98E+01	9.72E-02	0.00E+00	6.74E-02	2.64E-01	7.66E-03	3.70E-01
Water use	m^3 depr.	4.59E-01	2.06E-04	2.07E+00	2.53E+00	5.75E-04	0.00E+00	3.99E-04	5.75E-02	3.39E-04	-2.06E-02

The results of the environmental impact indicators — Abiotic depletion, Water use, and all optional indicators except Particulate matter and Ionizing radiation, human health — shall be used with care, as the uncertainties on these results are high or there is limited experience with the indicator. Reading example: 1.57E-03 = 1.57×10^{-3} = 0.00157.

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Additional environmental impact indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Particulate matter	Incidence	5.97E-08	2.61E-10	3.05E-09	6.30E-08	7.27E-10	0.00E+00	5.05E-10	9.84E-09	5.04E-11	-3.49E-09
Ionizing radiation, human health	Kbq U-235 eq	4.72E-02	3.34E-05	3.93E-03	5.11E-02	9.32E-05	0.00E+00	6.47E-05	4.16E-04	4.59E-07	-1.74E-03
Ecotoxicity (freshwater)	CTUe	2.17E+01	4.78E-03	6.00E-01	2.23E+01	1.33E-01	0.00E+00	9.24E-03	8.62E-02	5.50E-04	-5.86E-01
Human toxicity, cancer effects	CTUh	1.45E-09	4.27E-13	2.68E-11	1.48E-09	1.19E-12	0.00E+00	8.26E-13	3.76E-12	5.68E-14	-6.68E-11
Human toxicity, non-cancer effects	CTUh	9.37E-09	2.54E-11	8.75E-10	1.03E-08	7.08E-11	0.00E+00	4.91E-11	1.48E-10	1.28E-12	-3.08E-10
Land use related impacts/soil quality	Dimensionless	1.15E+01	4.01E-02	2.06E-01	1.17E+01	1.12E-01	0.00E+00	7.75E-02	2.87E-01	1.51E-02	-5.47E+00

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, or radioactive waste disposal in underground facilities. Potential ionizing radiation from soil, radon, and some construction materials is also not measured by this indicator.

GWP-GHG Indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG	Kg CO_2e	1.21E+00	2.56E-03	1.18E-01	1.33E+00	7.13E-03	0.00E+00	4.95E-03	1.72E-02	3.13E-04	-3.03E-02

This indicator includes all greenhouse gases, excluding biogenic carbon dioxide uptake and emissions, as well as biogenic carbon stored in the product, as defined by IPCC AR6 (2021). The indicator aligns closely with the Global Warming Potential (GWP) outlined in EN 15804:2012+A2:2019, incorporating updated characterization factors and environmental impact indicators.

Resource Use Indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Renewable PER used as energy	MJ	3.63E+00	5.38E-04	1.89E-02	3.65E+00	1.50E-03	0.00E+00	1.04E-03	7.53E-03	7.24E-05	-7.57E-01
Renewable PER used as materials	MJ	3.36E-03	0.00E+00	1.08E-04	3.47E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.39E-04

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Total use of renewable PER	MJ	3.63E+00	5.38E-04	1.90E-02	3.65E+00	1.50E-03	0.00E+00	1.04E-03	7.53E-03	7.24E-05	-7.57E-01
Non-renewable PER used as energy	MJ	1.79E+01	3.49E-02	1.92E+00	1.99E+01	9.72E-02	0.00E+00	6.74E-02	2.64E-01	7.66E-03	-4.31E-01
Non-renewable PER used as materials	MJ	1.50E-06	0.00E+00	4.07E-08	1.54E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.01E-06
Total use of non-renewable PER	MJ	1.79E+01	3.49E-02	1.92E+00	1.99E+01	9.72E-02	0.00E+00	6.74E-02	2.64E-01	7.66E-03	-4.31E-01
Use of secondary materials	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
Use of renewable secondary fuels	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	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	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	0.00E+00	0.00E+00
Use of net fresh water	m^3	0.00E+00	0.00E+00	1.24E-04	1.24E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste Indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	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
Non-hazardous waste	Kg	0.00E+00	0.00E+00	1.39E-01	1.39E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-02	0.00E+00
Radioactive waste	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

Output Flow Indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Components for reuse	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	9.79E-01
Materials for recycling	Kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.50E-01	0.00E+00	9.79E-01

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Materials for energy recovery	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
Exported energy - electricity	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	0.00E+00	0.00E+00
Exported energy - thermal	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	0.00E+00	0.00E+00

Biogenic carbon content

Details	Unit	A1-A3
Biogenic carbon content in product	Kg C	0.00E+00
Biogenic carbon content in accompanying packaging	Kg C	6.26E-04

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2. "Reading example: 1.57E-03 = $1.57*10^{-3}$ = 0.00157"

Disclaimer: “According to the **EN 15804:2012+A2:2019** standard, the LCIA results are relative expressions translating impacts into environmental themes such as climate change, ozone depletion, etc. (midpoint impact categories). Thus, the LCIA results do not predict impacts on category endpoints such as impact on the extinction of species or human health. In addition, the results do not provide information about exceeding thresholds, safety margins or risks”.

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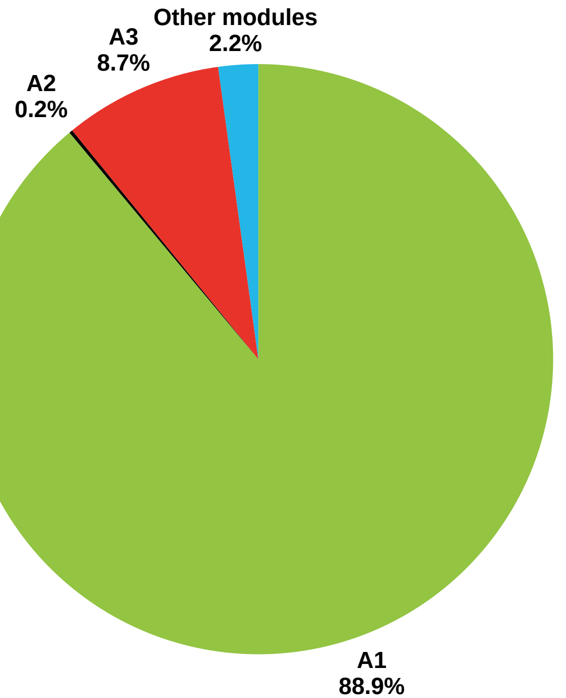
Interpretation

The results indicate that Modules A1–A3 are the primary contributors to the total GWP for NanoGrout EG, with A1 alone accounting for 88.93% driven mainly by epoxy resin production. Manufacturing activities in A3 contribute a further 8.70%, reflecting electricity use, internal handling, and packaging into HDPE containers and palletised loads. Transport of raw materials and finished product (A2 and A4) together represent less than 1% of total GWP, consistent with domestic sourcing and UAE-only distribution. End-of-life stages (C1–C4) contribute only 1.66%, as the cured grout follows concrete rubble processing routes. Overall, epoxy resin is the dominant hotspot, clearly highlighting opportunities for formulation optimisation, increased mineral filler share, or lower-carbon resin sourcing. These insights guide targeted improvements for future environmental performance.

Life Cycle Stage Contribution to GWP (kg CO_2e per 1 kg NanoGrout EG)



ENVIRONMENTAL PERFORMANCE

Mandatory Statements

Explanatory materials are available from the EPD Owner and/or LCA Author. The verifier and Program Operator make no claims and bear no responsibility regarding the legality of the study. Sole ownership, liability, and responsibility for the EPD lie with the EPD Owner. The LCA Author is not liable for manufacturer-provided information, life cycle data, or supporting evidence.

EPDs within the same product category, but issued by different EPD programs, may not be comparable. For valid comparison, both EPDs must be based on the same PCR (including version number), or on fully-aligned PCRs. Products must have identical function, technical performance, and use cases (e.g. the same declared or functional unit); share equivalent system boundaries, data descriptions, and data quality standards; use comparable collection methods and allocation rules; include matching content declarations; and be valid at the time of comparison.

Information related to EPD of multiple products

This is not an EPD of multiple products.

Information related to Sector EPD

This is not a sector EPD.

Differences vs previous versions

This is the first version of the EPD.

REVIEW AND VERIFICATION

Program Operator	International Climate Intelligence System 71-75 Shelton Street Covent Garden London, WC2H 9JQ United Kingdom
Registration Number	ICIS-202603-119
Publication Date	25-03-2026
Valid Until	24-03-2031
Geographical Scope	United Arab Emirates (UAE)
Product category rules (PCR): PCR 2026:18 Construction products (EN15804:2012+A2:2019/ AC:2021) Version 1.2.6 dated 21-Jan-2026	
PCR review was conducted by: International Climate Intelligence System	
Independent verification of the declaration and data, according to ISO 14025:2006 and ISO 14040: EPD Process Certification (internal) EPD Verification (external) ☑	
Third party verifier: Luis Manuel, International Climate Intelligence System (ICIS)	

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ACRONYMS

Acronym	Meaning
kg CO_2e	Kilograms of carbon-dioxide equivalent
kg CFC-11e	Kilograms of Chlorofluorocarbon-11 equivalent
mol H+e	Moles of hydrogen ion equivalent
kg PO_4^{3-} eq	Kilograms of phosphate equivalent
kg P eq	Kilograms of phosphorus equivalent
kg N eq	Kilograms of nitrogen equivalent
mol N eq	Moles of nitrogen equivalent
kg NMVOC eq	Kilograms of non-methane volatile organic compound equivalent
kg Sb eq	Kilograms of antimony equivalent
MJ	Megajoules
m^3 depr.	Cubic meters of water deprived
incidence	Unit representing human health impact related to particulate matter exposure
Kbq U-235 eq	Kilo-becquerels of Uranium-235 equivalent
CTUe	Comparative Toxic Unit for ecosystems
CTUh	Comparative Toxic Unit for humans
dimensionless	Unitless characterization factor — used for land-use/soil quality impacts
kg C	Kilograms of biogenic carbon contained in product or packaging

STANDARDS AND REFERENCES

Standards & Methodological Frameworks

- EN 15804:2012 + A2:2019 / AC:2021 – Sustainability of construction works – Core rules for environmental product declarations of construction products.
- ISO 14025:2006 – Environmental labels and declarations – Type III environmental declarations – Principles and procedures.
- ISO 14040:2006 – Life cycle assessment – Principles and framework.
- ISO 14044:2006 – Life cycle assessment – Requirements and guidelines.

PCR & Program Documents

- PCR 2026:18 Construction Products, Version 1.2.6 – International Climate Intelligence System (EN 15804+A2 aligned).
- EPD General Program Instructions (GPI) of International Climate Intelligence System, v2.0, 2023.

Databases, Tools & Modelling Sources

- Ecoinvent v3.11, system model: Allocation, cut-off by classification.
- Air.e.LCA Software v3.20.1.0 by Solid Forest – Used for LCA modelling and impact calculations.
- IPCC AR6 (2021) Characterization Factors – Applied for GWP indicators (where relevant).
- EF 3.1 (Environmental Footprint 3.1 method) – Used for all midpoint impact indicators.

Transport Calculation Tools

- Google Maps – Used to calculate road transport distances for raw materials, diesel and finished product delivery.

End-of-Life & Recycling

- UAE Construction & Demolition Recycling Facilities – Dubai Municipality, Tadweer (Abu Dhabi), BEEAH (Sharjah), and other emirates.
- International Construction & Demolition Recycling Benchmarks – Netherlands, Denmark, Belgium, Japan, Singapore.
- Landfill Avoidance Study, Virginia Tech & USDA Forest Service, 2018 – Recovery rates for wooden pallets.
- RecycledPlastic.com & PE/PET Recycling Reports – Plastics recycling industry data for LDPE recovery rates.
- PlasticsEurope & European Commission Circular Economy Guidance – Recovery performance for rigid HDPE packaging.
- WRAP (UK) – Recycling performance for clean LDPE film streams.


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