



ENVIRONMENTAL PRODUCT DECLARATION

NANOGROUT GP50

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-202603-117
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Leading the Middle East, **Conmix**
delivers innovative concrete and
plaster solutions.

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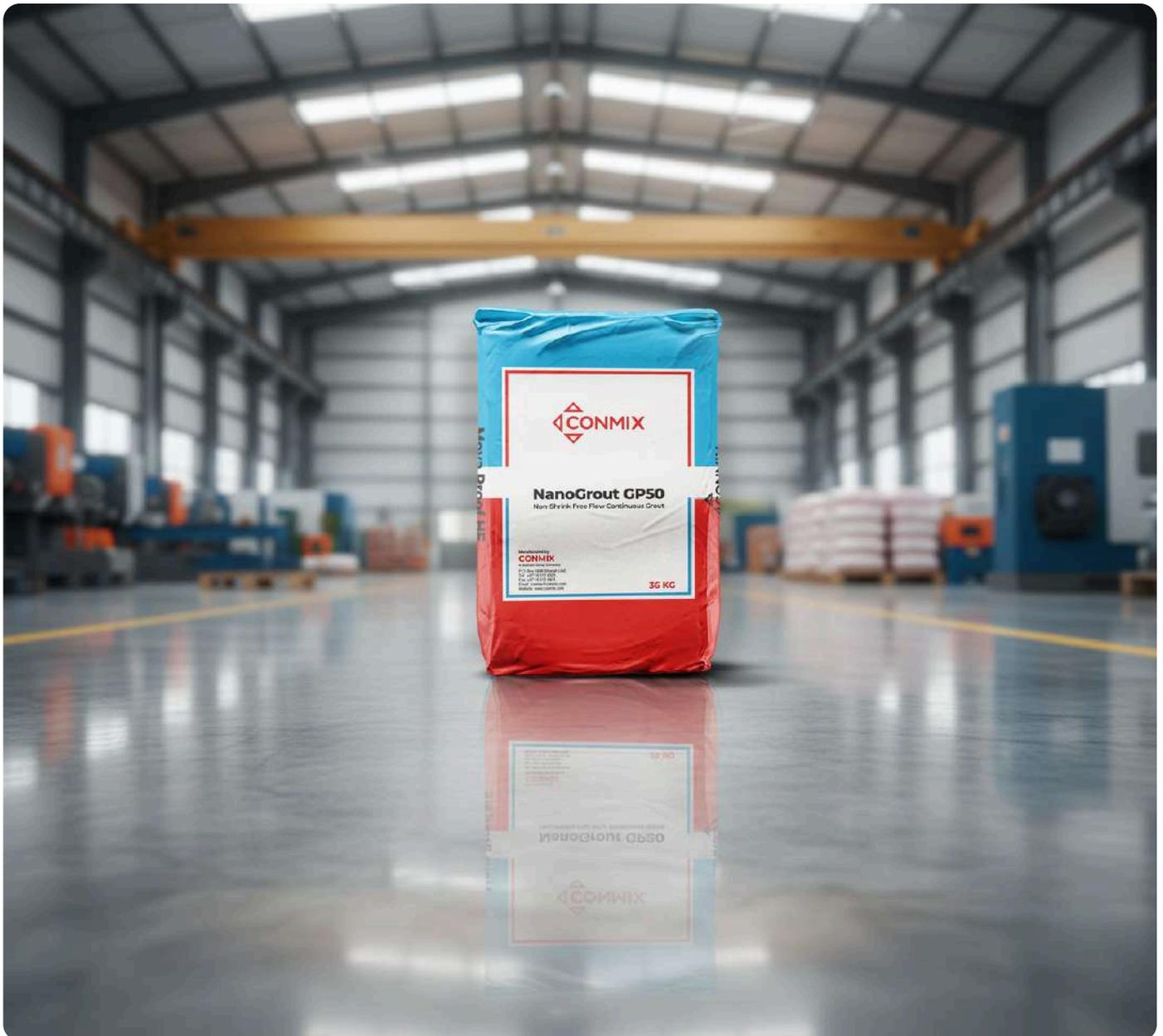
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Standards and References

OVERVIEW

This Environmental Product Declaration (EPD) presents verified, transparent environmental performance data for NanoGrout GP50, 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 GP50.

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 GP50



Product Type

Free-flow, non-shrink
cementitious 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

Dry-mix cementitious
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	6.35E-01	Kg CO ₂ e
Climate change (GWP) - fossil	6.32E-01	Kg CO ₂ e
Ozone Depletion (ODP)	8.02E-09	Kg CFC-11e
Abiotic depletion of fossil resources	6.42E+00	MJ

Hotspot Summary

Process	Share of Total GWP (%)
Raw Material Supply (A1)	73.83
Raw Material Transportation (A2)	0.95
Manufacturing (A3)	17.05
Remaining Modules (A4, C1-C4)	8.17



PRODUCT INFORMATION

Where This Adds Value

Scheme / Area	Relevance to NanoGrout GP50
LEED v4.1 (USGBC) – MR Credit: EPDs (aligned with emerging LEED v5 requirements)	The Type III EPD for NanoGrout GP50 supports Material Disclosure credits and contributes to whole-building embodied carbon accounting. GP50 is commonly used in UAE and KSA projects requiring LEED documentation for connection grouting, precast joints, and bolt pocket filling.
Estidama Pearl Rating System (Abu Dhabi)	Provides verified environmental data for LBo-6 and material transparency pathways. GP50 is frequently selected for filling joints between precast elements, tie-rod holes, and reinstatement works on Pearl-rated construction projects requiring documented material impacts.
GSAS (Qatar)	Supports material submittals requiring environmental performance data for QSAS/GSAS Material & Waste credits. GP50's quantified cradle-to-gate impacts enable clear comparison during approval of structural and non-shrink grouting materials.
BREEAM (UK/UAE Adaptations)	The EPD contributes to MAT 01 and MAT 02 credits related to responsible sourcing and whole-building LCA. GP50 is relevant to consultants working on infrastructure and building projects in Dubai, Abu Dhabi, and Riyadh requiring documented grout impacts.
Whole-Building LCA Tools	The cradle-to-gate with options LCA model for GP50 integrates directly into digital LCA tools for GCC mega-projects (metros, airports, mixed-use). It enables accurate modelling of non-shrink structural grouting used in precast and in-situ works.



PRODUCT INFORMATION

<p>Government & Giga-Project Requirements</p>	<p>Major clients such as NEOM, Red Sea Global, Diriyah Gate, and ADNOC request verified product-specific EPDs for material pre-qualification. GP50's EPD supports acceptance for grouting applications in large-scale structural and architectural packages.</p>
<p>Procurement Transparency (GCC Contractors)</p>	<p>Supports sustainability submissions for contractors and consultants who require environmental declarations for high-flow, non-shrink grouts used in precast connections, bolt pockets, masonry rehabilitation, and void filling during material approval.</p>



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 GP50 is a ready-to-use, free-flowing, non-shrink, high-strength cementitious grout formulated for general structural grouting and precision filling applications. Supplied as a single-component grey powder, it requires only the addition of clean water on site to achieve a flowable, cohesive mix with controlled expansion and excellent placement characteristics. Its formulation combines finely graded limestone sand, Ordinary Portland cement (OPC), graded mineral fillers, and additives that enhance water reduction, flow retention, and shrinkage compensation at low water-to-powder ratios.

The grout is designed for versatile construction applications where reliable load transfer, void filling, and durable support are essential. NanoGrout GP50 develops high early and long-term strength, exhibits no bleeding or segregation, and maintains dimensional stability under restrained conditions. Typical uses include filling joints between precast panels, grouting tie-rod holes, stiffener joints in masonry partitions, bolt pockets, baseplates, and reinstating damaged concrete within formwork. The product is available in 25 kg and 50 kg bags, providing flexibility for both small-scale and large-volume site requirements.

Sectors & Corresponding Uses

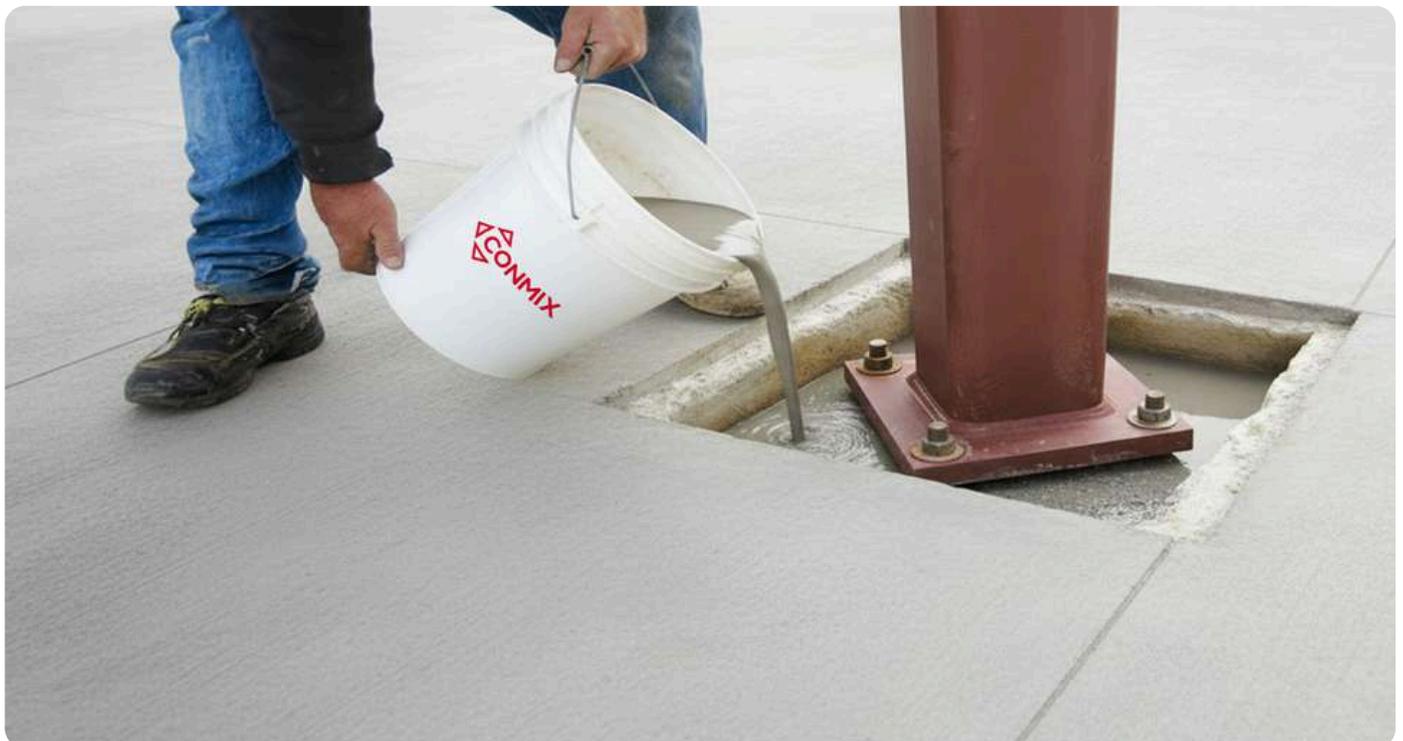
Sector	Application / Use Case
Precast & Prefabrication Works	Filling joints between precast panels, tie-rod holes, and alignment gaps to ensure uniform load transfer and secure bonding
Masonry & Partition Wall Construction	Creating stiffener joints in block, brick, and stone masonry walls for improved structural stability
Repair & Rehabilitation	Reinstating damaged structural elements, restoring bolt pockets, and repairing localized voids within formwork
General Construction & Site Works	Grouting of duct openings, equipment pads, dowel holes, and small voids requiring a free-flowing, non-shrink mix
Infrastructure & Utilities	Long-term durable grouting around embedded components in foundations, retaining structures, and utility corridors

Technical Specifications

Parameter	Details / Specification
Form	Single-component, free-flowing grey powder

PRODUCT DESCRIPTION

Mixing Water	Approx. 3.25–3.75 L per 25kg (or as per required flow)
Fresh Wet Density	2.28 kg/ltr ± 0.05
Flowability	10–30 seconds (initial) depending on W/P ratio
Compressive Strength	≥ 50 MPa at 28 days (depending on W/P ratio)
Flexural Strength	High flexural performance for structural grouting applications
Expansion	Upto 2% positive expansion
Bleeding	Nil
Chloride Content	Nil / meets BS EN 934-4 requirements
Pack Size	25 kg & 50 kg bags
Yield	12.3 ltr/25 kg bag
Application Method	Pouring or pumping into baseplates, foundations, voids, machine pads, precast elements, anchor pockets, and under-plate grouting



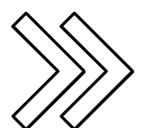
MANUFACTURING DETAILS

The production of NanoGrout GP50 at Conmix begins with the receipt and inspection of key raw materials, primarily finely graded limestone sand, Ordinary Portland Cement (OPC) and specialised admixtures that enhance flow, stability, and performance. All incoming materials undergo quality verification to ensure conformity with internal specifications before being transferred to dedicated silos, bins, or moisture-protected containers based on handling requirements and sensitivity.

During batching, each raw material is measured accurately through automated dosing systems to ensure a consistent formulation. These components enter the dry blending unit, where high-efficiency mixers homogenize the cement–limestone base with the performance additives. This blending stage ensures uniform dispersion of powders and contributes to GP50’s controlled expansion, high flowability, and stable grout performance at low water-to-powder ratios. No chemical reactions occur during manufacturing; the process remains purely physical.

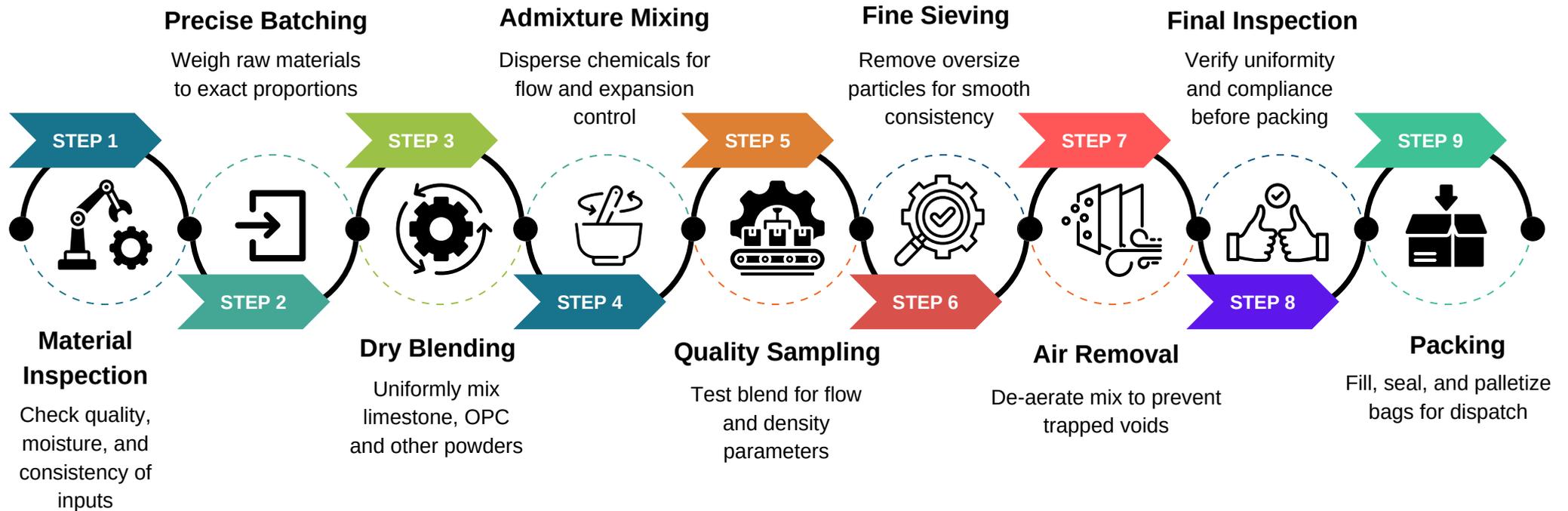
Following blending, the mix moves through fine sieving, which removes oversized particles and ensures a smooth, pumpable texture. Air removal further improves bulk density and flow characteristics. Quality checks—including flow tests, bulk density, and moisture verification—are performed on samples from each batch to ensure compliance with GP50’s technical datasheet requirements. Conforming batches proceed to final inspection and then to the automated packing line, where GP50 is filled into moisture-resistant 25 kg and 50 kg bags, 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.



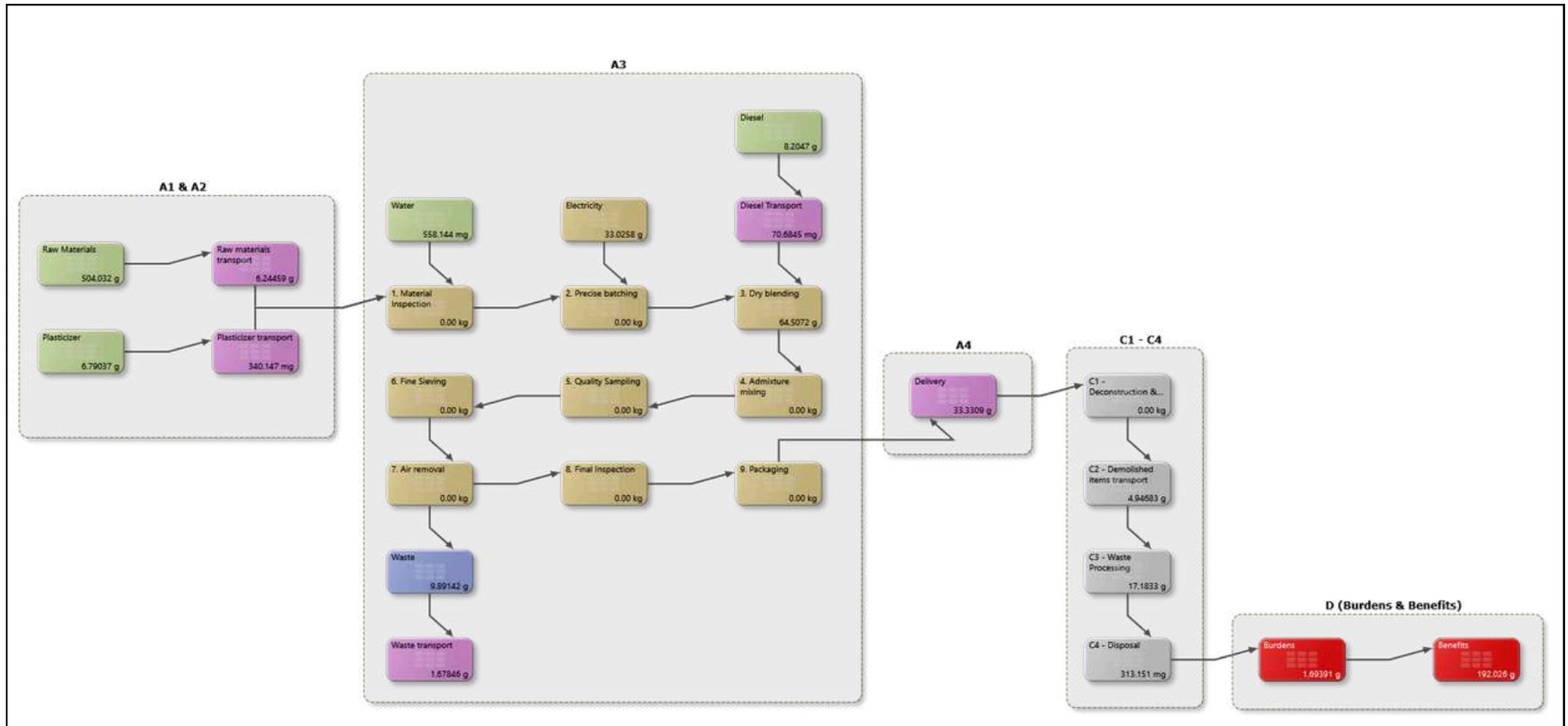
MANUFACTURING DETAILS

Schematic overview of NanoGrout GP50 manufacturing process



MANUFACTURING DETAILS

Screenshot of NanoGrout GP50 LCA model from LCA software



CONTENT DECLARATION

The content declaration provides a transparent breakdown of all raw materials used in the formulation of NanoGrout GP50, expressed per 1 kg of product. The mix is primarily composed of finely graded limestone sand and Ordinary Portland Cement (OPC), 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)
Limestone sand	0.58	0	0	0	0
Ordinary Portland Cement (OPC)	0.40	0	0	0	0
Super Plasticizer	0.004	0	0	0	0
Additives and Fillers	0.016	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 GP50 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—Limestone Sand, Ordinary Portland Cement, superplasticizer, additives, and fillers—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 GP50 include wooden pallets, multi-wall kraft cement bags, and LDPE liners. These materials serve distinct functions within the product supply chain—wooden pallets provide structural stability during handling and transport, kraft cement bags protect the dry powder product during storage, and LDPE liners prevent moisture ingress and preserve flowability. 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
Cement Bags	~100% biogenic (paper fibre)	0.44 kg C per kg paper (44% carbon content)	Paper/pulp industry data and IPCC default values for lignocellulosic biomass
LDPE Liners	0% biogenic	0 kg C/kg	Petroleum-based plastic; contains no biogenic carbon

Wood and cement bags contain significant biogenic carbon because they originate from biomass; LDPE does 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	2.50E-02	82.24	1.25E-02	Reuse / Recycle / Energy Recovery
LDPE Liners	1.40E-03	4.60	0.00E+00	Recycle / Energy Recovery
Cement Bags	4.00E-03	13.16	1.76E-03	Recycle
Total	3.04E-02	100	1.43E-02	-

Note - Biogenic content in packaging materials **exceed the 5% threshold** of the total packaging weight as stated in **ICIS PCR 2026:18**. Hence, these biogenic emissions are added in **module A3 and balanced out in module A5**.

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Declared Unit

The declared unit for this EPD is 1 kg of NanoGrout GP50 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 GP50 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 GP50 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 GP50 accurately reflects the actual production technology used at Conmix Ltd.'s Sharjah facility. The product is produced through a dry-mix blending process, incorporating OPC, limestone sand, graded fillers, and performance additives using industrial mixers, controlled batching systems, and automated sieving equipment. No chemical reactions, heating, or wet processes occur during production, and no by-products are generated. The technological assumptions used in the LCA are therefore fully representative of real operations at the plant, ensuring that the results reflect true site-specific conditions.

LCA KNOWLEDGE

LCA Software and Database

The life cycle model for NanoGrout GP50 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 GP50. The primary constituents—high-purity limestone sand 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 requirements. Additional components such as superplasticizers are sourced from Dammam, Saudi Arabia, while performance additives and fillers are obtained from a combination of local and international suppliers depending on 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—high-purity limestone sand, Ordinary Portland Cement (OPC), fillers, and performance additives—are

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sourced from suppliers within the UAE, while the superplasticizer is imported from Dammam, Saudi Arabia, reflecting the mixed local–regional nature of supply for GP50. All inbound movements are modelled using >32-ton Euro 6–equivalent road transport, representing typical logistics for bulk powders, bagged materials, and palletized chemical inputs. 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 GP50 product at the Conmix facility in Sharjah. Production follows a controlled dry-mix workflow comprising nine sequential steps: Material Inspection, Precise Batching, Dry Blending, Admixture Mixing, Quality Sampling, Fine Sieving, Air Removal, Final Inspection, and Packing. Each stage ensures accurate dosing, uniform dispersion of additives, consistent mix 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 (LDPE liners, cement bags, 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 GP50 from the Conmix manufacturing facility in Sharjah to customer locations. As NanoGrout GP50 is supplied both within the United Arab Emirates and to nearby international markets such as Iraq, outbound transport is modelled using a combination of road freight and regional export routes. 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 bagged cementitious materials in the region.

As a dry powder packaged in bags 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 and cross-border corridors to Iraq, covering distribution to

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construction sites, contractors, and infrastructure projects. Environmental impacts in this module include diesel consumption, tailpipe emissions, and load-dependent fuel use associated with outbound domestic and international 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



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Module C1 - Deconstruction and Demolition

Module C1 addresses the environmental impacts associated with deconstruction or demolition of the product at end-of-life. NanoGrout GP50 is used in baseplates, machine foundations, voids, ducts, and load-transfer zones where it hardens and becomes fully bonded within the surrounding concrete. Once cured, it no longer exists as a separate layer or component that can be removed independently.

During end-of-life demolition, the entire concrete element is broken using standard demolition equipment (e.g., hydraulic breakers or crushers). The grout undergoes the same mechanical breakup as the surrounding concrete and does not require any additional time, tools, fuel, or demolition effort specifically attributable to the product.

For example, if a pedestal, foundation block, or slab containing GP50 is demolished, the contractor does not identify or isolate the grout, nor does its presence alter the demolition sequence. The teardown method, machinery used, and resource consumption remain identical whether GP50 is present or not. Because no distinct or measurable demolition activities are attributable solely to NanoGrout GP50, the environmental burdens in Module C1 are considered zero.

Module C2 - Transport to Waste Processing

Module C2 covers the transportation of end-of-life material from the demolition site to appropriate waste management facilities. After demolition, NanoGrout GP50 exists as part of the mixed mineral rubble generated from breaking concrete structures. This rubble is handled exactly like other concrete and masonry demolition waste and is collected, loaded, and transported in bulk without requiring any separate treatment for the grout.

In regions such as the UAE, construction-and-demolition (C&D) waste is routinely diverted to recycling rather than disposal. Facilities operated under Dubai Municipality and Tadweer (Abu Dhabi Waste Management Company) consistently report very high recycling efficiencies — typically between 90% and 97% — for incoming concrete and masonry rubble due to active diversion policies and the widespread use of recycled aggregate in road construction and infrastructure works. These values correspond closely with international best practice, where countries with advanced C&D recycling systems (such as the Netherlands, Denmark, and Belgium) also achieve recovery rates in the 90–99% range.

Reflecting this established regional performance, a realistic transport scenario is adopted in which 95% of the mixed demolition rubble is transported to a C&D recycling facility, while the

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remaining 5% is transported directly to an inert landfill. This allocation accounts for typical non-recoverable residues, contaminants, or loads that bypass recycling due to quality or sorting constraints.

For both transport routes, an average one-way distance of 50 km is assumed, consistent with common distances between demolition sites, centralised C&D recycling hubs, and authorised landfill sites across the GCC and comparable global regions. Transport is modelled using a >32-ton EURO 6 lorry, representing a modern, fuel-efficient heavy-duty vehicle widely used for bulk mineral demolition waste transport.

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 has been routed to recycling facilities. Once NanoGrout GP50 is demolished together with the concrete element, it becomes part of the mixed mineral waste stream typically composed of concrete, masonry, mortar, and other construction materials. This mixed rubble is delivered to a construction-and-demolition (C&D) recycling plant, where a series of mechanical operations are carried out to recover usable aggregates.

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 GP50, as the hardened grout behaves identically to concrete during crushing.

Internationally, recycled concrete aggregates are widely used in applications such as road base, sub-base, trench bedding, general backfilling, footpath construction, landscaping fill, and non-structural concrete products. Countries with advanced C&D recycling systems—such as the Netherlands, Denmark, Belgium, Japan, and Singapore—routinely supply recycled aggregates for these applications due to high diversion efficiencies.

Within the GCC, similar practices are increasingly common as governments emphasise circularity and the diversion of C&D waste from landfill. Major recycling facilities across the UAE,

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Saudi Arabia, Qatar, and Oman process mixed mineral demolition waste into recycled aggregates used for infrastructure works, road construction, site preparation, and municipal projects. These uses align with how mineral waste containing NanoGrout GP50 would be recovered in the region.

Module C3 therefore includes the environmental impacts associated with crushing, separation, and grading of the mixed demolition waste containing NanoGrout GP50.

Module C4 - Disposal

Module C4 covers the disposal of the proportion of demolition waste that does not enter the recycling route. In this scenario, 5% of the mixed mineral rubble containing NanoGrout GP50 is assumed to be transported directly from the demolition site to an inert construction-and-demolition (C&D) landfill. This reflects established practice in the UAE and wider GCC region, where concrete and masonry rubble is predominantly recycled, while a small fraction that is contaminated, mixed, or unsuitable for recovery is directed to disposal. Similar dual-route disposal patterns are also observed internationally in regions with advanced C&D recycling systems.

The disposed material consists entirely of inert, inorganic mineral waste derived from concrete and hardened grout. Such materials do not biodegrade, do not generate landfill gas, and do not undergo significant chemical or biological breakdown. Any leachate produced from inert mineral waste is extremely limited and typically considered negligible in inert landfill operations worldwide.

Inert C&D landfills used across Europe, North America, Asia, and the GCC manage this material through mechanical placement, spreading, and compaction using earth-moving equipment, followed by routine cover and site management activities. These landfills are engineered specifically for non-reactive mineral wastes and are focused on long-term stabilization, dust suppression, and controlled deposition rather than biological or chemical treatment.

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. These outcomes reflect the substitution

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of primary materials with secondary materials recovered through recycling, reuse, or energy recovery routes. In this study, NanoGrout GP50 generates both burdens and benefits from the recovery of the mineral fraction of the demolition rubble and from recovered packaging materials.

At end-of-life, 95% of the mineral demolition rubble containing NanoGrout GP50 is processed at a construction-and-demolition (C&D) recycling facility, producing recycled aggregates that substitute natural crushed stone on a 1:1 mass basis. This high recovery systems—including the UAE and wider GCC—where concrete rubble is routinely converted into aggregates for road base, sub-base, trench bedding, backfilling, and landscaping applications. Reported recycling efficiencies for concrete and masonry rubble in GCC facilities frequently exceed 90–95%, consistent with international benchmarks observed in countries such as the Netherlands, Denmark, Belgium, Japan, and Singapore.

Packaging materials are also modelled with high recovery rates under controlled industrial conditions where source-separation is feasible. Wooden pallets are assumed to be recovered or repurposed at 95%, supported by the Landfill Avoidance Study (Virginia Tech & USDA Forest Service, 2018), which found that approximately 95% of wooden pallets are diverted from landfill through reuse, repair, or energy recovery. LDPE liners are assigned a 95% mechanical recycling rate, representing achievable performance when plastics are clean and separated at the point of generation, as noted by industry sources such as RecycledPlastic.com and PE/PET recycling reports. Multi-wall kraft cement bags are similarly modelled with 95% recovery, representing source-separated industrial collection streams where paper fibre is recycled or used as energy recovery feedstock.

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 LDPE, virgin kraft paper fibre, 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 GP50 in concrete collected as mixed construction waste	1

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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	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	UAE	UAE	UAE	GLO	-	-	-	-	-	-	-	-	GLO	GLO	GLO	GLO	GLO
Share of specific data	GWP > 90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

X - Included, ND - Modules not declared.

*Module A5 is included to balance out biogenic emissions from packaging.



LCA KNOWLEDGE

Cut-Off Rules

All relevant material and energy flows contributing to the manufacture of NanoGrout GP50 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 dry-mix 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 GP50 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%

LCA KNOWLEDGE

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 CO₂e 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 GP50 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 GP50. The production process involves only the transformation and blending of raw materials into a dry grout mixture, with no secondary materials or co-products formed at any stage. Since there are no outputs other than the final product and normal manufacturing residues (which are treated as waste), 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 GP50” is presented for the 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	A5	C1	C2	C3	C4	D
Climate change (GWP) - fossil	Kg CO ₂ e	5.08E-01	6.58E-03	1.17E-01	6.32E-01	3.41E-02	0.00E+00	0.00E+00	4.94E-03	1.71E-02	3.13E-04	-1.88E-01
Climate change (GWP) - biogenic	Kg CO ₂ e	0.00E+00	0.00E+00	5.23E-02	5.23E-02	0.00E+00	-5.23E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Climate change (GWP) - LULUC	Kg CO ₂ e	6.29E-04	3.16E-06	3.11E-05	6.64E-04	1.64E-05	0.00E+00	0.00E+00	2.38E-06	2.44E-05	1.78E-07	-5.88E-03
Climate change (GWP) - total	Kg CO ₂ e	5.11E-01	6.58E-03	1.18E-01	6.35E-01	3.41E-02	0.00E+00	0.00E+00	4.95E-03	1.72E-02	3.13E-04	-1.90E-01
Ozone depletion	Kg CFC-11e	3.40E-09	9.00E-11	4.53E-09	8.02E-09	4.50E-10	0.00E+00	0.00E+00	7.00E-11	2.70E-10	8.71E-12	2.48E-06
Acidification	mol H+e	2.24E-03	2.00E-05	9.10E-04	3.17E-03	8.00E-05	0.00E+00	0.00E+00	1.00E-05	1.30E-04	2.19E-06	-1.25E-03
Eutrophication, aquatic freshwater	kg PO ₄ ³⁻ eq	2.63E-04	1.54E-06	2.75E-05	2.92E-04	7.97E-06	0.00E+00	0.00E+00	1.16E-06	2.54E-05	8.41E-08	-1.66E-04
Eutrophication, aquatic freshwater	Kg P eq	8.56E-05	5.01E-07	8.95E-06	9.51E-05	2.60E-06	0.00E+00	0.00E+00	3.77E-07	8.28E-06	2.74E-08	-5.41E-05
Eutrophication, aquatic marine	Kg N eq	6.40E-04	4.17E-06	4.69E-04	1.11E-03	2.16E-05	0.00E+00	0.00E+00	3.13E-06	4.66E-05	8.44E-07	-3.57E-04
Eutrophication, terrestrial	mol N eq	6.97E-03	4.00E-05	4.09E-03	1.11E-02	2.30E-04	0.00E+00	0.00E+00	3.00E-05	5.00E-04	9.19E-06	-3.80E-03
Photochemical ozone formation	Kg NMVOC eq	2.28E-03	2.48E-05	1.26E-03	3.57E-03	1.28E-04	0.00E+00	0.00E+00	1.86E-05	1.61E-04	3.32E-06	-1.34E-03
Abiotic depletion, minerals & metals	Kg Sb eq	1.68E-06	1.97E-08	3.19E-07	2.02E-06	1.02E-07	0.00E+00	0.00E+00	1.48E-08	3.89E-08	4.60E-10	-8.74E-07
Abiotic depletion of fossil resources	MJ	4.41E+00	8.98E-02	1.92E+00	6.42E+00	4.65E-01	0.00E+00	0.00E+00	6.74E-02	2.64E-01	7.66E-03	-2.72E+00
Water use	m ³ depr.	1.27E-01	5.31E-04	2.07E+00	2.20E+00	2.75E-03	0.00E+00	0.00E+00	3.99E-04	5.75E-02	3.39E-04	-9.75E-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.

ENVIRONMENTAL PERFORMANCE

Additional environmental impact indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Particulate matter	Incidence	4.08E-08	6.72E-10	3.05E-09	4.45E-08	3.48E-09	0.00E+00	0.00E+00	5.05E-10	9.84E-09	5.04E-11	-2.95E-08
Ionizing radiation, human health	Kbq U-235 eq	9.59E-03	8.61E-05	3.93E-03	1.36E-02	4.45E-04	0.00E+00	0.00E+00	6.47E-05	4.16E-04	4.59E-07	-7.40E-03
Ecotoxicity (freshwater)	CTUe	1.54E+00	1.23E-02	6.00E-01	2.15E+00	6.37E-02	0.00E+00	0.00E+00	9.24E-03	8.62E-02	5.50E-04	-1.04E+00
Human toxicity, cancer effects	CTUh	1.27E-09	1.10E-12	2.68E-11	1.30E-09	5.69E-12	0.00E+00	0.00E+00	8.26E-13	3.76E-12	5.68E-14	-1.14E-09
Human toxicity, non-cancer effects	CTUh	3.70E-09	6.54E-11	8.75E-10	4.64E-09	3.38E-10	0.00E+00	0.00E+00	4.91E-11	1.48E-10	1.28E-12	-1.82E-09
Land use related impacts/soil quality	Dimensionless	1.12E+02	1.03E-01	2.06E-01	1.13E+02	5.34E-01	0.00E+00	0.00E+00	7.75E-02	2.87E-01	1.51E-02	-1.06E+02

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	A5	C1	C2	C3	C4	D
GWP-GHG	Kg CO ₂ e	5.11E-01	6.58E-03	6.56E-02	5.83E-01	3.41E-02	5.23E-02	0.00E+00	4.95E-03	1.72E-02	3.13E-04	-1.90E-01

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	A5	C1	C2	C3	C4	D
Renewable PER used as energy	MJ	1.56E+01	1.38E-03	1.89E-02	1.56E+01	7.16E-03	0.00E+00	0.00E+00	1.04E-03	7.53E-03	7.24E-05	-1.47E+01
Renewable PER used as materials	MJ	1.37E-03	0.00E+00	1.08E-04	1.48E-03	0.00E+00	-1.48E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.18E-04

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Total use of renewable PER	MJ	1.56E+01	1.38E-03	1.90E-02	1.56E+01	7.16E-03	-1.48E-03	0.00E+00	1.04E-03	7.53E-03	7.24E-05	-1.47E+01
Non-renewable PER used as energy	MJ	4.41E+00	8.98E-02	1.92E+00	6.42E+00	4.65E-01	0.00E+00	0.00E+00	6.74E-02	2.64E-01	7.66E-03	-2.72E+00
Non-renewable PER used as materials	MJ	1.26E-06	0.00E+00	4.07E-08	1.30E-06	0.00E+00	-1.30E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.13E-06
Total use of non-renewable PER	MJ	4.41E+00	8.98E-02	1.92E+00	6.42E+00	4.65E-01	-1.30E-06	0.00E+00	6.74E-02	2.64E-01	7.66E-03	-2.72E+00
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	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	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	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	0.00E+00

Waste Indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	Kg	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	0.00E+00	5.00E-02	0.00E+00
Radioactive waste	Kg	0.00E+00										

Output Flow Indicators

Impact Category	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for reuse	Kg	0.00E+00	9.79E-01									
Materials for recycling	Kg	0.00E+00	9.50E-01	0.00E+00	9.79E-01							

ENVIRONMENTAL PERFORMANCE

Materials for energy recovery	Kg	0.00E+00										
Exported energy - electricity	MJ	0.00E+00										
Exported energy - thermal	MJ	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	1.43E-02

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".

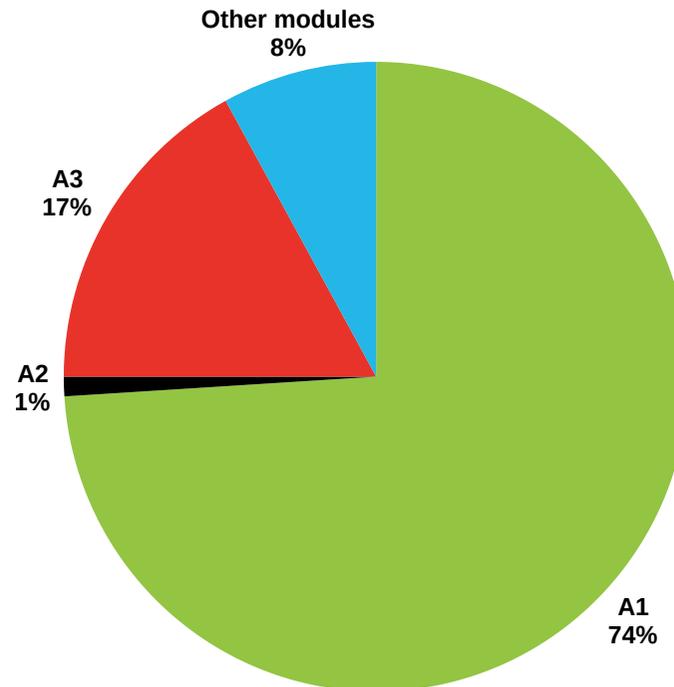


ENVIRONMENTAL PERFORMANCE

Interpretation

The results indicate that Modules A1–A3 are the primary contributors to the total GWP for NanoGrout GP50, with A1 alone accounting for 73.83% due to the impacts associated with Ordinary Portland Cement and limestone powder production. Manufacturing activities in A3 contribute a further 17.05%, reflecting electricity use, internal handling, and packaging operations. Transport of raw materials and finished product (A2 and A4) together represent less than 6% of total GWP, even though A4 includes international deliveries to Iraq. End-of-life stages (C1–C4) contribute only 3.24%, consistent with the inert nature of hardened grout. Overall, A1 remains the dominant hotspot, highlighting opportunities for reducing clinker content, optimising mix design, or sourcing lower-carbon binders. These insights guide targeted improvements for future environmental performance.

Life Cycle Stage Contribution to GWP (kg CO₂e per 1 kg NanoGrout GP50)



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-202603-117
Publication Date	20-03-2026
Valid Until	19-03-2031
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) <input checked="" type="checkbox"/>	
Third party verifier: Luis Manuel, International Climate Intelligence System (ICIS)	



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ACRONYMS

Acronym	Meaning
kg CO ₂ e	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).
- Oman Construction & Demolition Recycling Facilities – be'ah Oman.
- 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 – Plastics recycling industry data for LDPE recovery rates.



Building strength
with **Connix** at
every step