



شركة أسمنت الاتحاد (ش.م.خ.)
UNION CEMENT COMPANY (Pr.J.S.C)

THERMAL STABILIZATION



ENVIRONMENTAL PRODUCT DECLARATION

HT BLEND - OIL WELL CEMENT BLEND

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-202603-130
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Union Cement Company (Pr.J.S.C)
Khor Khwair Industrial Area,
Ras Al Khaimah, UAE
www.uccrakk.com



For the most current version and to confirm the validity of an EPD within International Climate Intelligence System, please refer to www.climateintell.com. EPDs are subject to revision or removal if conditions vary.

**WITH WORLD-LEADING CLINKER CAPACITY,
UNION CEMENT COMPANY DEFINES
STRENGTH**



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OVERVIEW

This Environmental Product Declaration (EPD) presents verified and transparent environmental performance data for HT Blend – Oil Well Cement Blend manufactured by Union Cement Company at its production facility in Ras Al Khaimah, United Arab Emirates, for the reporting period April 2024 to March 2025. The declared unit for this assessment is 1 metric ton of HT Blend – Oil Well Cement Blend.

The Life Cycle Assessment (LCA) has been conducted in accordance with 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 provides consistent, third-party-verified environmental information to support architects, engineers, developers, contractors, and sustainability professionals in embodied carbon assessment, green building certification schemes, and transparent procurement decision-making.



PRODUCT INFORMATION



Product Name

HT Blend – Oil Well Cement Blend



Product Type

Hydraulic binder for high-temperature oil and gas well cementing



Declared Unit

1 metric ton



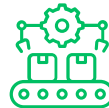
PCR & Version

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



Scope

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



Production Route

Dry blending process



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
71-75 Shelton Street, Covent Garden
London, WC2H 9JQ
United Kingdom
office@climateintell.com
www.climateintell.com



Product Group Classification

UN CPC 37440
(Portland Cement)

Environmental Performance Summary (A1-A3)

Indicator	Result	Unit
Climate change (GWP) - total	1.02E+03	Kg CO ₂ e
Climate change (GWP) - fossil	1.02E+03	Kg CO ₂ e
Ozone Depletion (ODP)	2.95E-05	Kg CFC-11e
Abiotic depletion of fossil resources	7.01E+03	MJ

Hotspot Summary

Process	Share of Total GWP (%)
Raw Material Supply (A1)	96.37
Raw Material Transportation (A2)	0.58
Manufacturing (A3)	1.88
Remaining Modules (A4, C1-C4)	1.17



PRODUCT INFORMATION

Where This Adds Value

Scheme / Area	Relevance to HT Blend – Oil Well Cement Blend
LEED v4.1 (USGBC) – Material Disclosure & Whole-Building LCA	LEED projects prioritise product-specific EPDs to support MR credits and improve embodied carbon assessments. While HT Blend is used in energy and drilling applications rather than building structures, this verified Type III EPD enables transparent cradle-to-gate modelling and supports sustainability reporting for energy and infrastructure developments involving high-temperature well systems.
Estidama Pearl Rating System (Abu Dhabi)	Pearl-rated infrastructure and government-led developments require environmental product transparency for material approvals. The availability of a verified EPD for HT Blend supports technical evaluation, enhances specification confidence, and contributes to embodied carbon disclosure for energy infrastructure and drilling-related installations within the UAE.
Oman Green Building Guidelines (OGBG)	Sustainability-focused projects in Oman increasingly require environmental documentation for materials used in infrastructure and industrial applications. This EPD provides quantified environmental performance data for HT Blend, supporting consultant evaluation, benchmarking, and acceptance in projects involving high-temperature well cementing operations in Northern Oman.
BREEAM International (UAE & GCC Projects)	BREEAM-aligned projects recognise products with verified environmental declarations as part of LCA-based assessments. This EPD supports project teams in evaluating the environmental performance of HT Blend used in energy-supporting infrastructure, enabling transparent reporting and alignment with responsible material sourcing practices.



PRODUCT INFORMATION

<p>Energy Infrastructure Embodied Carbon Assessment</p>	<p>HT Blend is specifically designed for high-temperature well cementing, where material selection directly influences the embodied carbon of drilling and production systems. Product-specific LCA data enables engineers to refine carbon modelling, optimise material selection, and support low-carbon strategies in technically demanding energy infrastructure projects.</p>
<p>Government & Infrastructure Procurement</p>	<p>Energy and infrastructure procurement frameworks increasingly require verified EPDs during material qualification and technical evaluation. Availability of this EPD strengthens Union Cement Company's positioning in UAE and Northern Oman projects by demonstrating environmental transparency and supporting compliance with evolving sustainability requirements.</p>
<p>Oilfield Service & Contractor Supply Chains</p>	<p>As environmental accountability becomes more prominent across oilfield operations, contractors and service providers benefit from access to verified HT Blend environmental data. This supports structured sustainability reporting, enhances supplier transparency, and enables differentiation within responsible energy supply chains operating in UAE and Northern Oman.</p>



ABOUT UNION CEMENT

Founded in 1972, Union Cement Company (UCC) is a pioneering cement manufacturer headquartered in Ras Al Khaimah. Operating one of the world's highest-capacity single clinker production lines, UCC produces over 13,500 tonnes per day. The company manufactures OPC, SRC, PLC, GGBFS, DrillWell cement, and clinker, supporting large-scale infrastructure, energy, transport, and industrial development projects with reliable, performance-driven manufacturing excellence.

UCC operates a fully integrated cement manufacturing facility in Ras Al Khaimah, covering:

- High-capacity dry-process clinker production with preheater–precalciner kiln technology.
- Large-scale cement grinding and dispatch operations serving UAE and Oman.
- Bulk and bagged cement supply to ready-mix, precast, and infrastructure sectors.
- Advanced laboratory testing and continuous process monitoring.
- Optimised fuel and raw material management systems.

UCC's production infrastructure is engineered for efficiency, consistency, and reliability — ensuring uninterrupted supply for major construction and infrastructure projects.

UCC maintains internationally recognised management systems and product

compliance standards, including:

- ISO 9001 – Quality Management System.
- ISO 14001 – Environmental Management System.
- ISO 45001 – Occupational Health & Safety Management System.
- Compliance with EN standards and relevant GCC regulatory requirements.
- Product conformity aligned with regional construction specifications.

UCC continues to invest in operational excellence, sustainability performance, and technological optimisation to meet the evolving demands of large-scale construction and infrastructure development across the UAE and Northern Oman.

Through world-leading clinker capacity, disciplined quality control, and responsible manufacturing practices, UCC remains a cornerstone supplier to the region's structural growth.



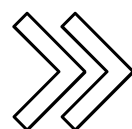
PRODUCT DESCRIPTION

HT Blend – Oil Well Cement Blend is a high-performance hydraulic binder formulated through the controlled blending of API Class G High Sulfate Resistant (HSR) oil well cement with a regulated proportion of silica flour to enhance performance under elevated temperature conditions. Supplied as a fine grey powder, it is mixed with water to form a pumpable slurry that sets and hardens to create a dense and thermally stable cement sheath within the wellbore. The composition combines the hydraulic properties of low tricalcium aluminate (C₃A) oil well cement with finely divided silica, which reacts with calcium hydroxide at high temperatures to prevent strength retrogression and ensure long-term durability in high-pressure, high-temperature downhole environments.

The product is designed for high-temperature cementing operations in onshore and offshore oil and gas wells where thermal stability and zonal isolation are critical. HT Blend provides reliable compressive strength retention, controlled thickening behaviour, and long-term integrity within thermally demanding subsurface conditions. Typical applications include deep well cementing, high-temperature casing and liner cementation, thermal recovery wells, and well abandonment operations. The product is supplied in bulk and jumbo bag formats, enabling efficient handling and controlled placement in drilling and production projects.

Sectors & Corresponding Uses

Sector	Application / Use Case
High-Temperature Onshore Wells	Cement slurry for casing in land wells, providing thermal stability, zonal isolation, and pressure control under high-temperature conditions
Offshore & Deep Wells	Well cementing for offshore and deep wells requiring stable cement sheath and resistance to strength loss at high temperatures
Thermal Recovery & EOR	Cementing in thermal recovery wells to ensure strength retention and durability under cyclic high-temperature conditions
High-Temperature Completions	Cementing of liners and casings to ensure hydraulic isolation and performance under elevated temperature conditions
Well Integrity & Remediation	Cementing for repair and remediation where thermal stability and durability are required in high-temperature environments



PRODUCT DESCRIPTION

Technical Specifications

Parameter	Details / Specification
Product Type	Hydraulic Binder (Silica-Modified Oil Well Cement Blend)
Strength Class	Conforming to API Specification 10A (Class G HSR based)
Form	Fine grey powder
Main Constituent	Oil Well Cement (API Class G HSR) blended with silica flour
Compressive Strength	Conforming to API 10A requirements with enhanced thermal stability
Thickening Behaviour	Controlled thickening time suitable for high-temperature well conditions
Initial Setting Characteristics	In accordance with API Specification 10A performance criteria
Free Fluid & Stability	Within API specified limits for slurry performance
Density (True)	Approx. 2.90–3.10 g/cm ³
Supply Format	Bulk tanker or 1,500 kg Jumbo Bags



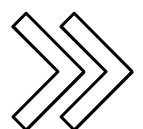
MANUFACTURING DETAILS

The production of HT Blend – Oil Well Cement Blend begins with the receipt and inspection of Oil Well Cement (API Class G HSR) and silica flour, both of which are selected to achieve the required performance under high-temperature well conditions. All incoming materials undergo quality verification to ensure conformity with specified chemical and physical requirements prior to storage and handling. The materials are received in bulk or bagged form and transferred to designated storage systems designed to maintain material integrity, prevent contamination, and ensure consistent flow characteristics for subsequent processing operations.

The stored materials are conveyed through controlled handling systems and directed to dosing units where Oil Well Cement and silica flour are proportioned in accordance with the specified formulation. Accurate dosing is essential to ensure consistent product composition and performance, particularly in applications requiring resistance to strength retrogression under elevated temperature conditions. The proportioned materials are transferred to intermediate storage systems, where the blend is stabilised and maintained under controlled conditions to ensure uniformity prior to final dispatch operations.

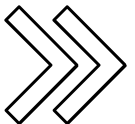
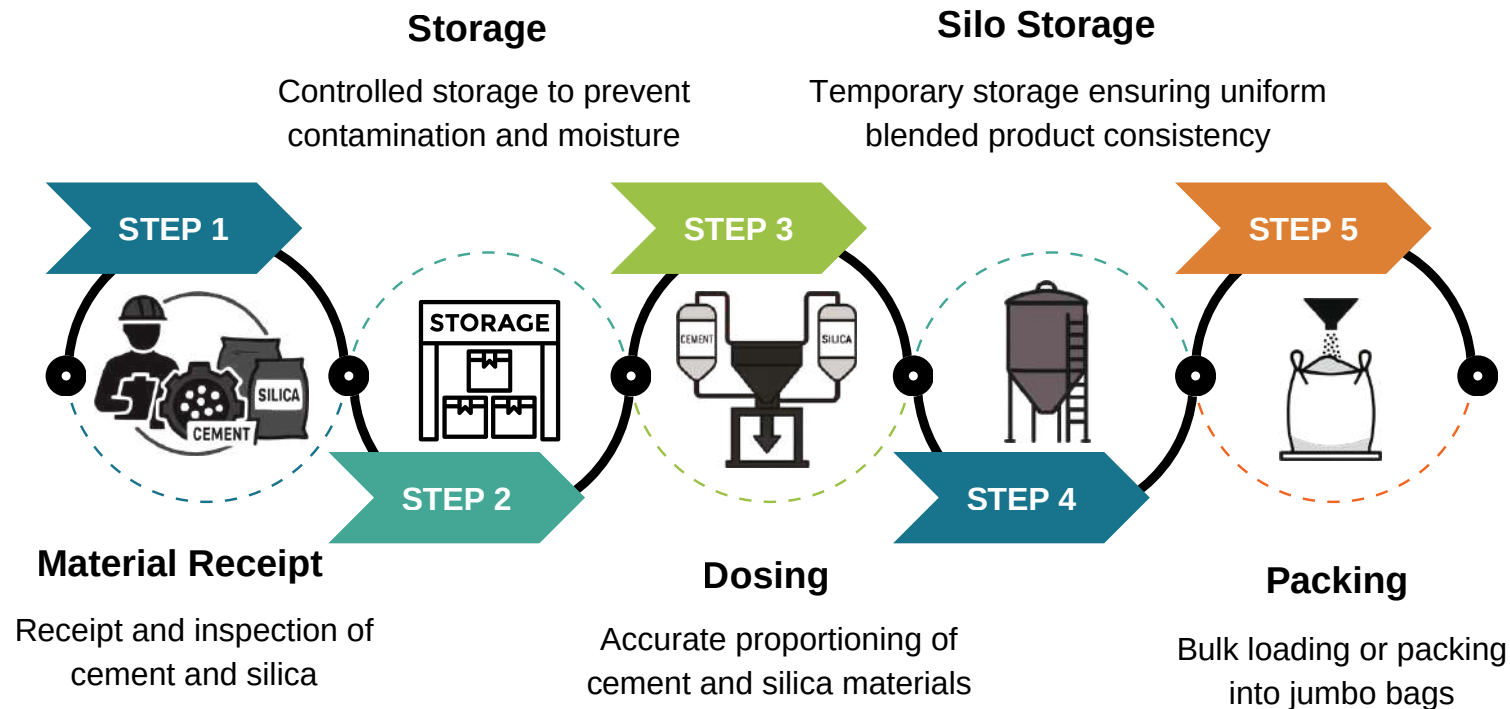
Following proportioning, the blended material is transferred to storage silos, where it is held prior to packaging and distribution. The final product is dispatched either in bulk form via tanker loading systems or packed into jumbo bags (FIBC) depending on project requirements. Throughout the process, quality control procedures are implemented to ensure that the product meets specified performance criteria for high-temperature oil and gas well cementing applications, including strength retention, stability, and operational consistency during placement in drilling and production environments.

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.



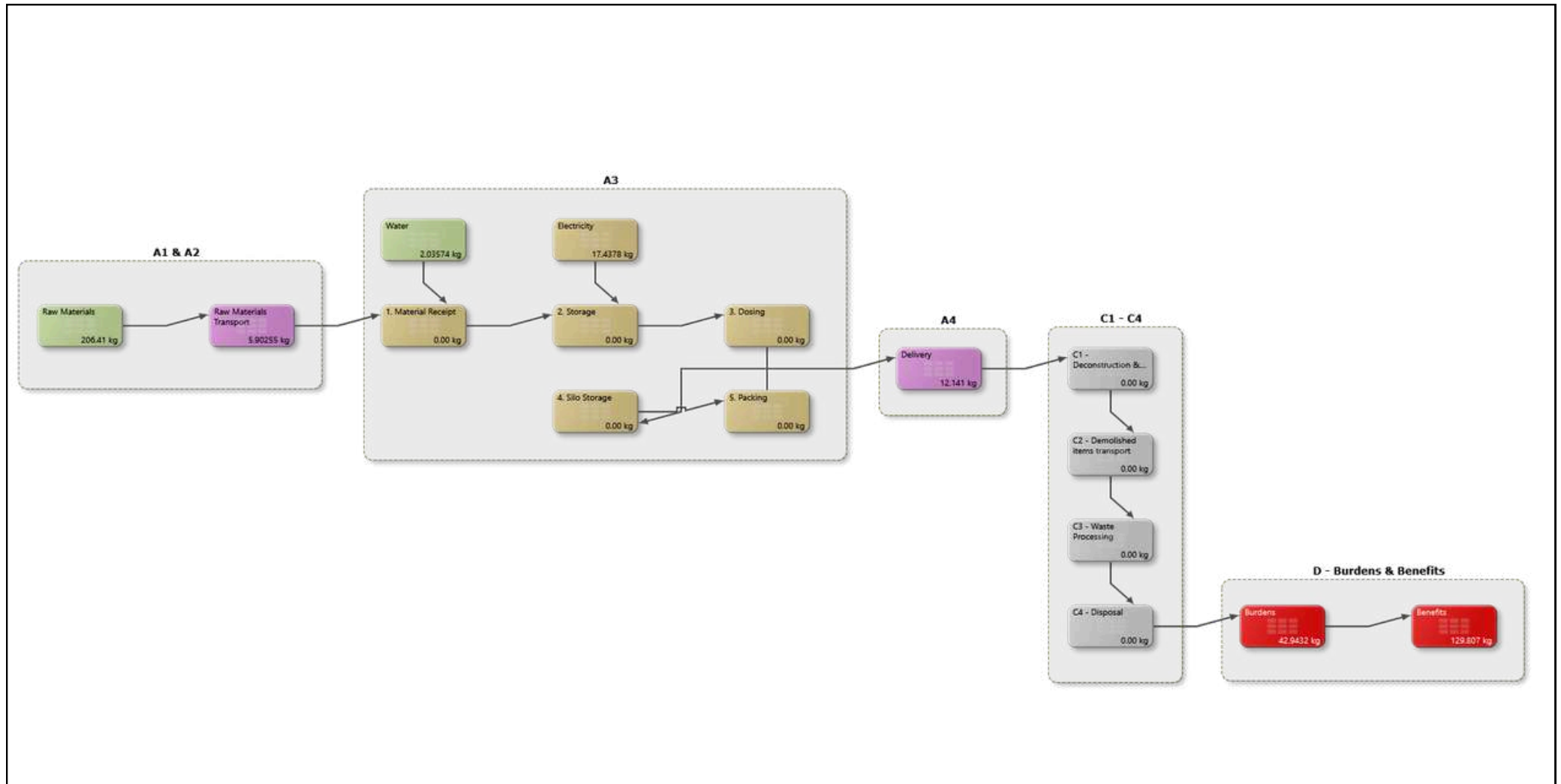
MANUFACTURING DETAILS

Schematic overview of HT Blend – Oil Well Cement Blend manufacturing process



MANUFACTURING DETAILS

Screenshot of HT Blend – Oil Well Cement Blend LCA model from LCA software



CONTENT DECLARATION

The content declaration provides a transparent breakdown of the constituent materials present in HT Blend – Oil Well Cement Blend, expressed per 1 metric ton of product. The blend is predominantly composed of Oil Well Cement (API Class G HSR) combined with a regulated proportion of silica flour to achieve enhanced thermal stability, strength retention, and performance under high-temperature downhole conditions. The total of all listed constituents equals 1 metric ton, matching the declared unit and ensuring complete material accounting in accordance 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)
Oil Well Cement (API Class G HSR)	650	0	0	0	0
Silica Flour	350	0	0	0	0
Total	1000	0	0	0	0

Substances of Very High Concern (SVHC)

According to the requirements of the ECHA Candidate List of Substances of Very High Concern (SVHC), HT Blend – Oil Well Cement Blend contains no substances listed above the 0.1% (w/w) threshold in the final product.

All principal constituents of the blend—Oil Well Cement (API Class G HSR) and silica flour—were reviewed against the latest published SVHC list at the time of reporting. Based on supplier declarations and available safety data sheets, no SVHCs are present in concentrations exceeding regulatory reporting thresholds.

Packaging Material Declaration

Packaging materials used for HT Blend – Oil Well Cement Blend include jumbo bags (FIBCs), wooden pallets, pull tie cords, sling bag caps, PVC binding straps, and LDPE protective sheets. Each component performs a defined function within the supply chain—jumbo bags contain and protect the powder product, pallets enable stable stacking and mechanical handling, binding straps and LDPE sheets secure palletised loads during transport, and auxiliary components such as pull ties and caps ensure closure and lifting integrity.

All packaging materials are included in the life cycle assessment, as they contribute to upstream manufacturing impacts and form recoverable or disposable material streams at end-of-life in accordance with EN 15804 requirements.



CONTENT DECLARATION

Packaging Material	Biogenic Content (%)	Biogenic Carbon Fraction (kg C/kg material)	Notes & References
Wooden Pallet	~100% (solid wood)	0.50 kg C/kg	IPCC (2006) Guidelines — wood contains ~50% carbon by dry mass.
Jumbo Bags (PP - FIBC)	0%	0 kg C/kg	Polypropylene is petroleum-based; contains no biogenic carbon.
Pull Tie Cord (PP)	0%	0 kg C/kg	Polypropylene accessory component; fossil-based polymer.
Sling Bag Caps (PP)	0%	0 kg C/kg	Injection-moulded polypropylene; fossil-based carbon.
Binding Strap (PVC)	0%	0 kg C/kg	PVC is petroleum-based; no biogenic carbon content.
LDPE Sheet	0%	0 kg C/kg	Low-density polyethylene is fossil-based; contains no biogenic carbon.

For HT Blend – Oil Well Cement Blend, wooden pallets contain significant biogenic carbon, as they originate from lignocellulosic biomass derived from solid wood. In contrast, jumbo bags (polypropylene), pull tie cords, sling bag caps, binding straps (PVC), and LDPE protective sheets are fossil-based polymer materials and therefore do not contain biogenic carbon.

These biogenic fractions are reported transparently to reflect the temporary storage of renewable carbon within the packaging system. Their modelling and reporting in the LCA follow EN 15804+A2 requirements, with biogenic carbon 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	5.93E-04	0.65	2.97E-04	Reuse / Recycle / Energy Recovery
Jumbo Bags (PP - FIBC)	9.12E-02	99.34	0.00E+00	Reuse / Recycle / Energy recovery



CONTENT DECLARATION

Pull Tie Cord (PP)	5.30E-07	0.0006	0.00E+00	Energy recovery / Landfill
Sling Bag Caps (PP)	3.97E-07	0.0004	0.00E+00	Energy recovery / Landfill
Binding Strap (PVC)	5.97E-07	0.0006	0.00E+00	Recycle (limited) / Energy recovery
LDPE Sheet	9.67E-06	0.01	0.00E+00	Recycle / Energy recovery
Total	9.18E-02	100	2.97E-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**.



LCA KNOWLEDGE

Declared Unit

The declared unit for this EPD is 1 metric ton of HT Blend – Oil Well Cement Blend 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 HT Blend – Oil Well Cement Blend reflects the reporting period April 2024 to March 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 Ras Al Khaimah 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 HT Blend – Oil Well Cement Blend reflects the actual manufacturing and supply conditions of Union Cement Company's Ras Al Khaimah 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 practices in the UAE, ensuring geographical relevance of the final results.

Technological Representativeness: The manufacturing process modelled for HT Blend – Oil Well Cement Blend accurately reflects the dry blending technology used at Union Cement Company's facility. Production includes material receipt and handling, storage of Oil Well Cement (API Class G HSR) and silica flour, controlled dosing of constituents, transfer to storage silos, and final packing for dispatch. The process involves mechanical handling and blending operations without high-temperature thermochemical reactions, kiln processing, or calcination, as the base cement is produced upstream.

LCA KNOWLEDGE

The technological assumptions applied in the LCA represent a blending-based production system consistent with downstream cement modification processes. Energy inputs associated with material handling, dosing, storage, and packing are included to reflect actual plant conditions, while clinker production and associated process emissions are accounted for upstream within the Oil Well Cement input. The modelling approach therefore represents real industrial blending practice for silica-modified oil well cement and ensures that the results are aligned with site-representative manufacturing conditions.

LCA Software and Database

The life cycle model for HT Blend – Oil Well Cement Blend 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 associated with the production and supply of input materials used in the manufacture of HT Blend – Oil Well Cement Blend. The principal constituents—Oil Well Cement (API Class G HSR), produced internally by Union Cement Company, and silica flour sourced from suppliers within the United Arab Emirates—ensure full traceability and conformity with defined quality specifications. Packaging materials are procured from suppliers within the UAE and include jumbo bags (FIBC), wooden pallets, pull tie cords, sling



LCA KNOWLEDGE

bag caps, binding straps, and LDPE protective sheets. Activities included within this module comprise clinker and cement production, silica extraction and processing, electricity generation, packaging material production, and the manufacture of auxiliary inputs required for blending and dispatch operations.

Module A2 - Raw Material Transportation

Module A2 covers the transportation of externally sourced materials to the Union Cement Company facility in Ras Al Khaimah, United Arab Emirates. The principal externally sourced constituent for HT Blend production—silica flour—is sourced within the UAE and transported to the plant using >32-ton Euro 6 lorry, representative of bulk material transport within the country. Packaging materials are sourced from the UAE, Oman, and India. Materials from the UAE and Oman are transported by >32-ton Euro 6 lorry, while packaging materials imported from India are transported via sea freight container ship to Mina Saqr port and subsequently delivered by >32-ton Euro 6 lorry to the Ras Al Khaimah facility.

Environmental impacts in this module arise from diesel combustion in heavy-duty road transport and marine fuel combustion in container shipping. Transport distances, load factors, and logistics modelling reflect realistic GCC supply chain conditions, ensuring representative accounting of both domestic and international inbound transport to the Ras Al Khaimah plant.

Module A3 - Manufacturing

Manufacturing impacts cover all processes required to convert input materials into finished HT Blend – Oil Well Cement Blend at the Union Cement Company production facility in Ras Al Khaimah. Production follows a controlled, non-thermal process comprising five sequential stages: Material Receipt, Storage, Dosing, Silo Storage, and Packing. These stages ensure proper material handling, accurate proportioning of Oil Well Cement (API Class G HSR) and silica flour, maintenance of product uniformity, and preparation of the final blend to achieve the required performance characteristics for high-temperature well cementing applications.

Environmental loads in this module include electricity consumption for material handling, dosing systems, silo operations, and packing; internal material transport via conveyors and mobile equipment; and minor auxiliary energy use associated with plant operations. No thermal energy, kiln operation, or process-related calcination emissions are involved, as the base cement is produced upstream. Additional impacts include minor solid waste generation from handling systems and routine maintenance activities. All direct emissions associated with electricity use, on-site equipment operation, and material handling are included within the A3 system boundary.



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Module A4 - Delivery

Module A4 accounts for the transportation of finished HT Blend - Oil Well Cement from the Union Cement Company manufacturing facility in Ras Al Khaimah, United Arab Emirates, to customer locations. The product is supplied to construction and infrastructure projects across the UAE and Northern Oman, including Dubai, Abu Dhabi, Sharjah, Ajman, Fujairah, Umm Al Quwain, Al Ain, Sohar, and Musandam. Outbound transport is modelled using >32-ton Euro 6 lorry, representing typical bulk cement and palletised bag transport within the GCC regional road network.

HT Blend - Oil Well Cement is delivered primarily in bulk form or in jumbo bags for drilling operations and energy infrastructure applications. Transport modelling assumes high load utilisation consistent with industrial cement distribution practices in the region. Environmental impacts in this module include diesel consumption, tailpipe emissions, and distance-based fuel use associated with road transport from the Ras Al Khaimah facility to project sites across the UAE and Northern Oman corridor.

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 covers impacts from activities required to deconstruct or demolish the product at the end of its service life. HT Blend – Oil Well Cement Blend is used for high-temperature cementing operations in onshore and offshore oil and gas wells, where it is pumped into the annular space between the casing and the geological formation. Upon hydration, the blend forms a hardened cement sheath that provides zonal isolation, thermal stability, and structural support to the casing system in accordance with industry well integrity requirements and cementing practices defined by API standards.

Unlike cement used in building structures, HT Blend is not incorporated into removable construction elements. Once placed and set, the cement sheath remains permanently in situ



LCA KNOWLEDGE

within the wellbore throughout the operational life of the well and during well abandonment. International petroleum engineering guidance and well integrity frameworks (e.g., American Petroleum Institute standards and International Association of Oil & Gas Producers well integrity guidelines) recognize that cement sheaths are not dismantled or demolished at end-of-life; rather, they remain underground as part of the permanent well barrier system. Consequently, no deconstruction, demolition, or material removal activities are attributable to HT Blend as a standalone product.

Therefore, no environmental burdens are assigned to Module C1 for HT Blend, as the product is neither dismantled nor subjected to demolition operations at the end of its service life.

Module C2 - Transport to Waste Processing

Module C2 accounts for transport of the product from the point of deconstruction to waste treatment or disposal facilities. For HT Blend – Oil Well Cement Blend used in high-temperature downhole oil and gas applications, no removal or excavation of the cement material occurs at end-of-life. Industry well abandonment practices defined under American Petroleum Institute guidance and aligned with International Association of Oil & Gas Producers frameworks do not require extraction or off-site transfer of the hardened cement sheath.

As the cement remains permanently in situ and is not transported to any waste processing or disposal facility, no transport activities are attributable to the product in Module C2. Therefore, environmental burdens for Module C2 are declared as zero.

Module C3 - Waste Processing

Module C3 includes impacts associated with waste processing operations carried out prior to final disposal or recovery. For HT Blend – Oil Well Cement Blend used in oil and gas well cementing applications, no mechanical, thermal, or chemical waste processing operations occur at the end of the well's service life. Industry well closure practices established under American Petroleum Institute standards and supported by International Association of Oil & Gas Producers guidance do not involve crushing, treatment, or material recovery of the hardened cement sheath.

As no waste processing activities are performed and the cement material is not subjected to recycling or treatment operations, no environmental burdens are assigned to Module C3.

Module C4 - Disposal

Module C4 covers impacts associated with final disposal of the product at end-of-life. For HT Blend – Oil Well Cement Blend used in oil and gas well cementing applications, the hardened



LCA KNOWLEDGE

cement sheath remains permanently in situ within the subsurface environment and is not removed for disposal in landfill or other waste facilities. Well abandonment and barrier management practices defined by the American Petroleum Institute and reflected in International Association of Oil & Gas Producers guidance do not involve excavation or external disposal of the cement material.

As no landfill or external disposal operations are attributable to the product, no environmental burdens are assigned to Module C4.

Module D - Reuse, Recovery and Recycling Potential

Module D reports the net environmental benefits and burdens resulting from material recovery processes that substitute primary production outside the system boundary, in accordance with EN 15804+A2.

Mineral Fraction (HT Blend – Oil Well Cement Blend)

HT Blend is used in downhole oil and gas applications where, following placement and hydration, the material forms part of the permanent well barrier system. The hardened cement sheath remains in situ within the subsurface environment throughout the operational life of the well and during abandonment procedures conducted in accordance with industry guidance from the American Petroleum Institute and the International Association of Oil & Gas Producers.

As the material is neither removed nor subjected to recycling or recovery operations, no substitution of primary materials occurs beyond the system boundary. Accordingly, no benefits or burdens are assigned in Module D for the mineral fraction.

Wooden Pallets – 95% Recovery

Wooden pallets are assumed to be reused or recycled at a rate of 95%, reflecting established industrial reuse markets and high recovery rates reported by pallet industry studies (National Wooden Pallet & Container Association, 2016). Regional segregation frameworks in the UAE support recyclable wood recovery through licensed waste operators (Dubai Municipality, 2022).

Jumbo Bags (FIBC – Polypropylene) – 75% Recovery

Flexible Intermediate Bulk Containers (FIBCs) are reusable industrial packaging products made of polypropylene fabric. A 75% recovery rate is assumed, reflecting industrial reuse practices and the recyclability of polypropylene materials (PlasticsEurope, 2023). Regional waste operators in the UAE and Oman maintain plastic recycling capacity for segregated industrial streams (BEEAH Group, 2023).



LCA KNOWLEDGE

Pull Tie Cord (Polypropylene) – 10% Recovery

Small plastic accessory components such as pull tie cords are assigned a 10% recovery rate due to limited segregation in construction waste streams. International plastic packaging recycling statistics indicate lower capture rates for small plastic components compared to bulk packaging (Eurostat, 2023).

Sling Bag Caps (Polypropylene) – 5% Recovery

Detached plastic caps are assumed to have minimal recovery (5%) due to their small size and low likelihood of source separation within C&D waste management systems.

Binding Strap (PVC) – 15% Recovery

PVC binding straps are assigned a 15% recovery rate, reflecting limited recycling capture for flexible PVC packaging materials. International plastic recovery data indicate moderate-to-low recycling rates for such materials without dedicated take-back schemes (PlasticsEurope, 2023).

LDPE Sheet – 95% Recovery

LDPE sheets are assumed to be recovered at 95% under an industrial source-segregated collection scenario. The UAE maintains plastic recycling infrastructure capable of processing LDPE materials (BEEAH Group, 2023), and LDPE film exhibits high recycling potential when clean and segregated (PlasticsEurope, 2023).

Process	Unit (metric ton)
Collection process specified by type	
HT Blend – Oil Well Cement Blend remaining in situ within wellbore	1
Recovery system specified by type	
Mineral fraction sent for reuse / recycling	Not applicable
Mineral fraction sent for energy recovery	Not applicable
Disposal specified by type	
Mineral fraction sent to landfill	Not applicable
Transportation assumptions	
Transport to recycling and landfill sites	Not applicable

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.



LCA KNOWLEDGE

Cut-Off Rules

All relevant material and energy flows contributing to the manufacture of HT Blend – Oil Well Cement Blend 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 energy inputs were used across multiple cement product lines. Electricity consumption, water use, and diesel for internal handling were allocated using a mass-based approach, reflecting each product's proportional share of total annual production at the Ras Al Khaimah facility.

Raw materials—including Oil Well Cement (API Class G HSR) and silica flour—and all related transport flows were modelled using product-specific primary data, as these inputs are directly proportioned for HT Blend – Oil Well Cement Blend and do not require allocation. No economic allocation was applied, as the plant does not generate co-products within the cement manufacturing process.

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 Union Cement Company’s Ras Al Khaimah facility.

Calculation Rules

The LCA model for HT Blend – Oil Well Cement Blend uses foreground data collected directly from Union Cement Company’s Ras Al Khaimah manufacturing facility, combined with background datasets sourced from Ecoinvent v3.11 (Allocation, cut-off by classification). These datasets provide emission factors for key inputs, including Oil Well Cement (API Class G HSR), silica flour, electricity generation, packaging materials, and transportation. Regionally representative conditions—such as UAE electricity mixes, supplier distances, and GCC end-of-life practices—were incorporated where relevant to ensure representativeness.

Transport activities for raw material supply, packaging procurement, and finished product delivery are included based on actual supplier-to-plant and plant-to-customer road distances. Road distances were measured using Google Maps, while sea freight distances for packaging imported from India were determined using portdistance.com. Exclusions are limited to items of negligible relevance (<1%), such as administrative activities, office utilities, and capital equipment maintenance. Transport flows are therefore fully represented within the defined geographical scope.

Byproducts Assignment

No by-products are generated during HT Blend – Oil Well Cement Blend manufacturing. The only outputs are finished cement and process emissions from fuel combustion and calcination. Therefore, no allocation is required.

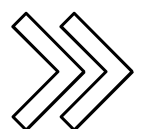


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ENVIRONMENTAL PERFORMANCE

In the following tables, the environmental performance of the declared unit “1 metric ton of HT Blend – Oil Well Cement Blend” is presented for Union Cement Company. Environmental impacts are calculated using EF 3.1 (ILCD). As HT Blend is produced through blending of Oil Well Cement (API Class G HSR) with silica flour, the environmental impacts associated with Oil Well Cement production (Modules A1–A3) by Union Cement Company are included within Module A1 of the HT Blend system boundary, reflecting its use as a primary input material in the final product.



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 ₂ e	9.97E+02	5.90E+00	1.95E+01	1.02E+03	1.21E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.68E+01
Climate change (GWP) - biogenic	Kg CO ₂ e	1.09E-03	0.00E+00	0.00E+00	1.09E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Climate change (GWP) - LULUC	Kg CO ₂ e	1.53E-01	2.76E-03	3.65E-03	1.60E-01	5.83E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-7.04E-03
Climate change (GWP) - total	Kg CO ₂ e	9.97E+02	5.90E+00	1.95E+01	1.02E+03	1.21E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.69E+01
Ozone depletion	Kg CFC-11e	2.05E-05	7.26E-08	9.02E-06	2.95E-05	1.62E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.57E-06
Acidification	mol H ⁺ e	6.11E+00	5.55E-02	3.77E-02	6.21E+00	2.88E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.50E-01
Eutrophication, aquatic freshwater	kg PO ₄ ³⁻ eq	5.94E-01	1.10E-03	4.02E-03	5.99E-01	2.84E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.40E-03
Eutrophication, aquatic freshwater	Kg P eq	1.94E-01	3.57E-04	1.31E-03	1.95E-01	9.25E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.74E-03
Eutrophication, aquatic marine	Kg N eq	8.54E-01	1.40E-02	8.80E-03	8.77E-01	7.69E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.50E-02
Eutrophication, terrestrial	mol N eq	9.01E+00	1.55E-01	9.09E-02	9.26E+00	8.27E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.87E-01
Photochemical ozone formation	Kg NMVOC eq	3.55E+00	5.00E-02	5.45E-02	3.65E+00	4.58E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-5.66E-01
Abiotic depletion, minerals & metals	Kg Sb eq	5.80E-04	1.36E-05	1.89E-05	6.12E-04	3.63E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.22E-05
Abiotic depletion of fossil resources	MJ	6.60E+03	7.48E+01	3.30E+02	7.01E+03	1.66E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.30E+03
Water use	m ³ depr.	1.11E+02	3.78E-01	2.20E+00	1.13E+02	9.79E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.50E+01

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	C1	C2	C3	C4	D
Particulate matter	Incidence	7.22E-05	4.93E-07	2.86E-07	7.30E-05	1.24E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.12E-06
Ionizing radiation, human health	Kbq U-235 eq	2.75E+01	6.19E-02	1.76E+00	2.93E+01	1.59E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.83E+00
Ecotoxicity (freshwater)	CTUe	1.60E+03	9.11E+00	3.54E+01	1.64E+03	2.27E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.20E+02
Human toxicity, cancer effects	CTUh	1.66E-07	9.77E-10	6.23E-09	1.73E-07	2.03E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.91E-08
Human toxicity, non-cancer effects	CTUh	4.60E-06	4.76E-08	5.61E-08	4.71E-06	1.21E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.25E-07
Land use related impacts/soil quality	Dimensionless	7.24E+03	7.12E+01	9.34E+00	7.32E+03	1.90E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.62E+03

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 ₂ e	9.97E+02	5.90E+00	1.95E+01	1.02E+03	1.21E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.69E+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	C1	C2	C3	C4	D
Renewable PER used as energy	MJ	8.86E+02	9.94E-01	3.51E+00	8.91E+02	2.55E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.25E+02
Renewable PER used as materials	MJ	7.15E-01	0.00E+00	2.49E-02	7.40E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-02



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Total use of renewable PER	MJ	8.87E+02	9.94E-01	3.53E+00	8.92E+02	2.55E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-2.25E+02
Non-renewable PER used as energy	MJ	1.40E+04	7.48E+01	3.30E+02	1.44E+04	1.66E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.30E+03
Non-renewable PER used as materials	MJ	2.13E-03	0.00E+00	2.62E-06	2.13E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-9.10E-06
Total use of non-renewable PER	MJ	1.40E+04	7.48E+01	3.30E+02	1.44E+04	1.66E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.30E+03
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	4.53E-01	0.00E+00	4.53E-01	9.06E-01	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	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	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	6.90E+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	0.00E+00	0.00E+00	6.90E+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	2.97E-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".



ENVIRONMENTAL PERFORMANCE

Interpretation

The life cycle results for HT Blend – Oil Well Cement Blend demonstrate a strongly upstream-dominated environmental profile, with Module A1 accounting for 96.37% of total GWP. This distribution is technically consistent with blended oil well cement systems, where impacts are driven by the inclusion of Oil Well Cement as a primary input material. The environmental burdens associated with clinker production, including high-temperature kiln operation and process-related CO₂ emissions from calcium carbonate decomposition, are embedded within the upstream Oil Well Cement contribution and therefore concentrated within A1. The addition of silica flour reduces the effective clinker content of the final product, while the environmental footprint remains dominated by upstream cement production processes incorporated within the blend.

Module A2 (0.58%) remains comparatively low, reflecting the regional sourcing structure of the Ras Al Khaimah production system. Silica flour and packaging materials are sourced within the UAE, Oman, and India, with transport modelled using >32-ton Euro 6 road freight and marine container shipping where applicable. The relatively small contribution of A2 confirms that inbound logistics, although involving both domestic and international supply chains, contribute minimally to the overall environmental profile when compared to upstream cement production impacts embedded within A1.

Module A3 (1.88%) represents the manufacturing stage of HT Blend, comprising material handling, dosing, silo storage, and packing operations at the Union Cement Company facility. As the process does not involve kiln operation, calcination, or thermal energy-intensive transformation, environmental impacts in A3 are limited primarily to electricity consumption and internal material handling activities. The low contribution of A3 reflects the non-thermal, blending-based production route, distinguishing HT Blend from clinker-based cement manufacturing processes.

Module A4 (1.17%) represents outbound transport of HT Blend to drilling and energy-sector markets across the UAE and Northern Oman. Distribution is modelled using >32-ton Euro 6 road freight vehicles, consistent with bulk and jumbo bag delivery practices. Although A4 contributes to the overall footprint, its share remains modest, confirming that regional transport distances do not significantly influence the carbon profile compared to the upstream impacts associated with Oil Well Cement.

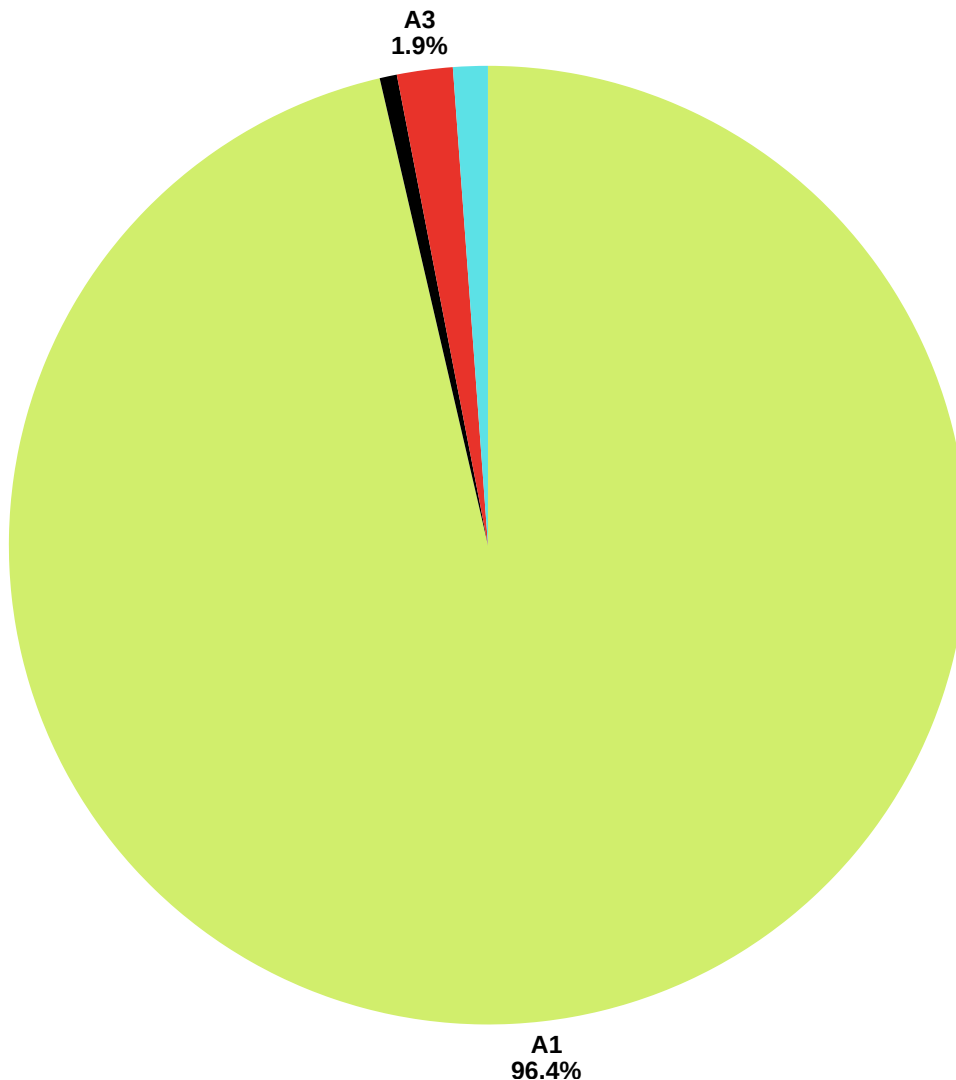
End-of-life modules (C1–C4) are zero for HT Blend, reflecting its downhole application pathway rather than a construction demolition scenario. Following placement and hydration, the material



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forms part of the permanent well barrier system and remains in situ within the subsurface environment, with no deconstruction, transport, waste processing, or landfill disposal attributable to the mineral fraction. Consequently, the life cycle profile is governed predominantly by upstream material production, with limited contributions from blending operations and regional transport. The resulting impact distribution is technically robust and representative of a silica-modified oil well cement blend produced through downstream blending of clinker-based cement within a defined regional supply chain.

Life Cycle Stage Contribution to GWP (kg CO₂e per 1 metric ton of HT Blend – Oil Well Cement Blend)



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-202603-130
Publication Date	26-03-2026
Valid Until	25-03-2031
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: <input type="checkbox"/> EPD Process Certification (internal) <input checked="" type="checkbox"/> EPD Verification (external)	
Third party verifier: Constantine Stephen, International Climate Intelligence System (ICIS)	



CONTACT DETAILS



EPD Owner

Nitin Asnani
Process Manager

Union Cement Company (Pr.J.S.C)
Khor Khwair Industrial Area, RAK
P.O Box 170, United Arab Emirates

Email - info@uccrak.com
Website - www.uccrak.com



EPD Author

Alan Beski Christopher
Sustainability Manager

GCAS Quality Certifications
P.O Box 65561
Dubai, United Arab Emirates

Email - info.dubai@gcasquality.com
Website - www.gcasquality.com

EPD Verifier

Constantine Stephen
Glasgow, United Kingdom

Accredited by
International Climate Intelligence System
71-75 Shelton St, London WC2H 9JQ,
United Kingdom

Program Operator



Email - office@climateintell.com
Website - www.climateintell.com



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 – Road transport distance calculations.
- PortDistance.com – Maritime transport distance calculations.

End-of-Life & Recycling

- American Petroleum Institute (API) (2019). API Specification 10A – Specification for Cements and Materials for Well Cementing. American Petroleum Institute, Washington, D.C., United States.
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- International Association of Oil & Gas Producers (IOGP) (2016). Well Integrity Guidelines. IOGP Report Series No. 476, London, United Kingdom.
- International Organization for Standardization (ISO) (2017). ISO 16530-1: Petroleum and Natural Gas Industries — Well Integrity — Part 1: Life Cycle Governance. ISO, Geneva, Switzerland.

STANDARDS AND REFERENCES

- National Wooden Pallet & Container Association (2016). U.S. Pallet Recycling Study. NWPCA / Virginia Tech Study, United States.
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- BEEAH Group (2023). Waste Recycling and Processing Operations in the UAE. BEEAH Group, Sharjah, United Arab Emirates.
- Dubai Municipality (2022). Waste Segregation and Construction & Demolition Waste Recycling Guidelines. Government of Dubai, United Arab Emirates.
- Tadweer (Abu Dhabi Waste Management Center) (2023). Construction and Demolition Waste Recycling Operations and Diversion Practices. Abu Dhabi, United Arab Emirates.



Raising standards with
Union Cement Company
strengthening every
stride.

