NUGREEN — ADVANCED CEMENT TECHNOLOGY

Technical Data Sheet

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1. PRODUCT OVERVIEW

NuGreen is an advanced hydraulic cement technology that replaces Portland clinker with industrial mineral resources activated by a proprietary chemistry incorporating a biomass-based component. It serves the same function as Portland cement concrete and is compatible with conventional ready-mix production, transport and placement equipment.

2. MATERIAL SYSTEM

- Industrial mineral byproducts (fly ash, ground blast-furnace slag) replace Portland clinker as the primary cementitious feedstock.
- Proprietary ambient-temperature activation — no clinker kiln, no calcination stage.
- Drop-in handling at the plant: existing silos, hoppers, batch plants, mixers and pump lines; no equipment modifications required. “Drop-in” describes plant and equipment only — it does not extend to admixture regimes.

3. ENVIRONMENTAL PERFORMANCE

Cradle-to-gate GWP	**82.6 kg CO_2e/m^3**	63.3 kg CO_2e/yd^3 — Independent LCA data§
Primary energy	**1,248 MJ/m^3**	Independent LCA data
Production water	**149 L/m^3**	85 L batch + 64 L process — Independent LCA data
Acidification	**0.56 kg SO_2e/m^3**	Independent LCA data
Eutrophication	**0.20 kg N/m^3**	Independent LCA data
Smog formation	**8.82 kg O_3e/m^3**	Independent LCA data
GWP vs published benchmark	**~81% lower**	Benchmark comparison vs published 6,000 psi U.S. national data*
Water / energy vs benchmark	**~52% / ~57% lower**	Benchmark comparison*

§ Historical environmental result reported in an externally verified EPD for a reference concrete (6,000 psi design strength, cradle-to-gate A1–A3, U.S. basis). Applicability to current production is under review; product-specific environmental verification is pending.

Environmental reference figures are cradle-to-gate (raw materials, inbound transportation, production), for a 6,000 psi reference concrete. ∗Benchmark percentages are NuGreen calculations against published NRMCA / PCA industry data; see the published methodology at www.nugreen.ch/impact#methodology.

4. COMPRESSIVE STRENGTH

Typical 28-day design range	**45–55 MPa**	≈ 6,500–8,000 psi — standard production mixes · Technical performance

Rapid early strength	**~5,000 psi (~35 MPa)**	at ~90 minutes · Technical performance
24-hour reported result	**~9,000 psi (~62 MPa)**	Technical performance
Reported high-performance result (28d)	**13,000+ psi (≈90 MPa)**	Reported result set — not a typical production value · Technical performance

> The typical 28-day design range and the reported high-performance result (primary laboratory report pending) describe different conditions. Production mixes should not be assumed to reach 13,000 psi; project-specific mix qualification governs.

5. FRESH-STATE PROPERTIES

Setting time, working time, slump, density	**Not yet published**	pending UAE placement-condition testing¶

> ¶ Setting time, working time, slump and density are withheld until they have been measured under representative UAE placement conditions, including hot-weather placement, with the test method, mix identification, fresh and ambient temperature, time from batching, admixture product and dosage, and measurement interval recorded.

6. DURABILITY AND HARDENED PROPERTIES

Sulfate resistance	**Reported: excellent**	ASTM C1012 · Technical performance‡
Chloride-ion penetration	**Reported: <1,000 C**	ASTM C1202 · Technical performance†‡
Freeze-thaw resistance	**Reported: 300+ cycles**	ASTM C666 · Technical performance‡
Alkali-silica reaction	**Mitigated**	by fly ash chemistry · Technical performance
Shrinkage (28d)	**< 0.03%**	Technical performance
Flexural strength (28d)	**6–10 MPa**	Technical performance

> ‡ Reported hardened-state result. Primary laboratory reports are being consolidated into the substantiation file; test age, curing regime, mix identification and laboratory are not yet published.
> † ASTM C1202 applies where correlations have been established between the test and long-term chloride ponding for the concrete type under test. Such correlations are not established for alkali-activated systems, so this result is not used as the principal chloride-transport qualification for the current product. Chloride-migration testing to NT Build 492, targeting exposure classes XS1/XS3 and XC3/XC4, has been specified following engineering review; results will be published once testing is complete.

7. STANDARDS

- Binder conforms to ASTM C1157 (Performance Specification for Hydraulic Cement).
- Concrete produced in accordance with ASTM C94 (Ready-Mixed Concrete).
- Specified under CSI MasterFormat 03 30 00 (Cast-in-Place Concrete).
- Reported results reference ASTM C39, C666, C1202 and C1012; primary laboratory reports are being consolidated into the substantiation file.
- Fly ash feedstock meets ASTM C618.

8. APPLICATIONS

Road and highway repair · airports and runways · ports and marine infrastructure · industrial floors · precast · bridges and structural rehabilitation · mass concrete · wastewater and aggressive environments · commercial and institutional construction. Application suitability is confirmed through project-specific evaluation.

9. STORAGE & HANDLING

- Dry materials are handled, stored and blended using existing silos, hoppers and batching systems.
- Equipment compatibility: standard mixers, pump lines, formwork and finishing plant.
- Admixture compatibility is established per project. Conventional admixture performance in this binder system has not been generalised and should not be assumed. Qualification starts with PCE superplasticisers, the dominant admixture family in UAE ready-mix.
- Pumping performance — line length, pressure and placement duration — is established per project. Equipment compatibility is not a validated pumping specification. Pumping qualification targets 60–80 m lines at up to 100 bar, over placement durations representative of high-heat UAE conditions.
- Fresh-state properties (setting time, working time, slump and density) are withheld until they have been established under representative UAE placement conditions; no placement window should be assumed from earlier published data.
- Hot-weather performance is under validation with a UAE ready-mix partner; no temperature limits are stated until that programme reports.
- Store dry and protected from moisture, per standard cementitious-material practice.

10. PROJECT-SPECIFIC QUALIFICATION

Values in this data sheet are reference and reported figures classified under NuGreen's published evidence taxonomy (Independent LCA Data, Benchmark Comparison, Technical Performance). Project performance depends on local materials, mix design, curing conditions and acceptance criteria. Project-specific mix data, trial batches and pilot pours are available through NuGreen technical support.

11. CONTACT / TECHNICAL SUPPORT

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