

## DIVISION 03 - CONCRETE SPECIFICATION

### RECOMMENDED SPECIFICATION INSERT LANGUAGE

*Concrete specification and/or procurement language for the incorporation of concrete made with carbon dioxide (CO<sub>2</sub>) injected and subsequently mineralized into concrete by CarbonCure technology.*

### INTRODUCTION

CarbonCure Technologies is the world leader in carbon dioxide utilization solutions for concrete. CarbonCure's technology beneficially repurposes waste CO<sub>2</sub> in concrete production in order to reduce embodied carbon while maintaining concrete performance. The technology is installed in concrete plants across North America and parts of the globe.

CarbonCure's technology injects CO<sub>2</sub> (captured from industrial emitters) into concrete during the manufacturing process, in a process analogous to admixture injection. Once injected, the CO<sub>2</sub> chemically converts (in-situ) into a calcium carbonate nano-mineral and becomes permanently embedded in the concrete. The in-situ CO<sub>2</sub> mineralization provides a compressive strength benefit that allows concrete producers to reduce cementitious content while maintaining strength and other fresh and hardened concrete properties.

The injection and subsequent mineralization of CO<sub>2</sub> meets the requirements of ASTM C494 Type S admixture.

Cement manufacturing generates ~7% of global CO<sub>2</sub> emissions. Reductions in cement content decrease concrete's carbon footprint. CarbonCure typically enables a 5% decrease to GWP (kg CO<sub>2</sub>e) as reflected on Environmental Product Declarations, available through select concrete producers.

Utilizing CO<sub>2</sub> mineralization to optimize cementitious content may require adjustments to specification requirements for minimum cementitious content and/or maximum water-cementitious ratios, as approved by project engineers and designed by concrete producers. Project engineers may also consider using performance-based concrete specifications to further reduce embodied carbon.

Builders and designers may reduce the carbon footprint of concrete while ensuring equivalent performance by requesting concrete made with CO<sub>2</sub> mineralization in the specification language.

CO<sub>2</sub> mineralization is a non-exclusive process available to any ready mix concrete producer within the United States, Canada and select international locations. Pending local adoption rates, concrete made with CO<sub>2</sub> may be available in select markets through a single supplier or through multiple concrete suppliers, resulting in a competitive bidding environment.

A requirement for CO<sub>2</sub> mineralization in national or international master specifications may be impractical due to lack of competitive bidding or availability in some regions. It is therefore recommended that specifications with a broad geographic scope consider adopting language that *allows (or prefers) concrete made with CO<sub>2</sub> mineralization where available, pending concrete performance criteria is met.*

Including this recommended language in national scope specifications removes sustainability-inhibiting barriers, and provides a market signal that embodied carbon reduction strategies are valued. This language ensures that concrete suppliers that are capable of supplying CO<sub>2</sub> mineralized concrete are empowered to do so.

This document is provided in MS Word to allow for copying and/or modification of specification language, at the discretion of the engineer, architect or specification writer.

Further information about CarbonCure Technologies can be found at [www.carboncure.com](http://www.carboncure.com).

## 1. CARBON DIOXIDE (CO<sub>2</sub>) MINERALIZATION REQUIREMENTS (OR PREFERENCE OR ALLOWANCE)

### 1.1 ENVIRONMENTAL / SUSTAINABLE REQUIREMENTS

*Optional language: CO<sub>2</sub> mineralized concrete is permitted (or preferred) where available, pending concrete performance criteria is met.*

CO<sub>2</sub> mineralization: Supply CO<sub>2</sub> mineralized concrete, such that post-industrial carbon dioxide (CO<sub>2</sub>) is injected into the concrete like an admixture and chemically converted into a mineral. The concrete may undergo mix optimization whereby the strength enhancement property of the mineralized CO<sub>2</sub> is utilized to adjust cementitious content, pending that the optimized concrete mix meets concrete performance requirements as outlined in this specification document.

Acceptable technologies: CarbonCure Ready Mix Concrete Technology.

**1.1.a** The injection and subsequent mineralization of CO<sub>2</sub> meets the requirements of ASTM C494 Type S admixture.

**1.1.b** For Canadian projects see CAN/CSA-A23.1 Annex S, Concrete made with carbon dioxide as an additive (revised June 2018).

### 1.2 VERIFICATION:

**1.2.1** Provide CarbonCure Concrete Additive Product Data Sheet in concrete mix submittal.

### 1.3 CONCRETE PRODUCT WITH CO<sub>2</sub> MINERALIZATION

**1.3.1** Minimum cementitious content and maximum water/cementing materials ratio requirement as outlined by this specification will be reviewed and may be adjusted by the Engineer pending review of submittal, if required. Adjustment of cementitious content and water/cementing materials ratio requirement will be at the sole discretion of the Engineer.

### 1.4 CARBONCURE REFERENCE AND CONTACT INFORMATION

**1.4.1** For CarbonCure ready mix concrete product availability and regional contact information, visit [www.carboncure.com/producers](http://www.carboncure.com/producers).

**1.4.2** For general inquiries contact [info@carboncure.com](mailto:info@carboncure.com) or +1 (902) 442-4020.

**END OF SECTION**

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