Reducing the Carbon Footprint of Concrete with CO_2 Utilization

Carbon Negative Technology Innovations Fighting Climate Change

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CARBON CURE™
Simply better concrete.

Did You Know?

Embodied carbon is expected to account for nearly **50%** of the carbon footprint of new construction. **Concrete** is typically the largest contributor to embodied carbon on a project.

Source: Architecture 2030

What is CarbonCure?

CO_2 Utilization in Concrete

CarbonCure's mission is to reduce **500 megatonnes of CO_2** emissions annually. That's equivalent to taking over **100 million cars** off the road every year.

What is CarbonCure?

CO_2 Utilization in Concrete

CarbonCure's technology beneficially repurposes carbon dioxide to reduce the carbon footprint of concrete without compromising concrete performance.

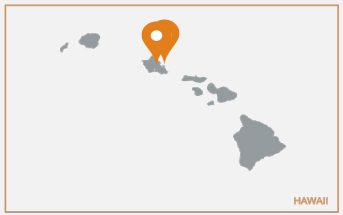
CarbonCure Concrete Impact

Operating at
300+ Concrete Plants

Used in
8,000,000+ yd³ of concrete

Resulting in
100,000+ tonnes CO_2 saved

Compliance with
ASTM C494 Type S

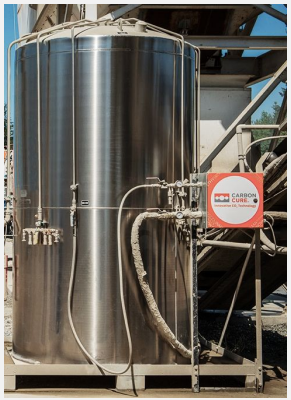


How it works

Seamless retrofit technology that integrates with existing concrete operations

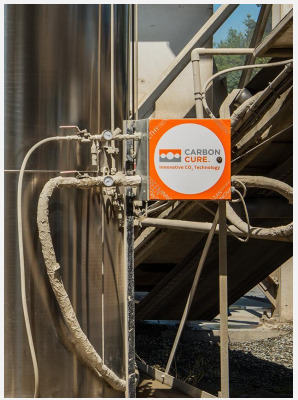
Collection

CO_2 is collected from large emitters and purified by industrial gas suppliers



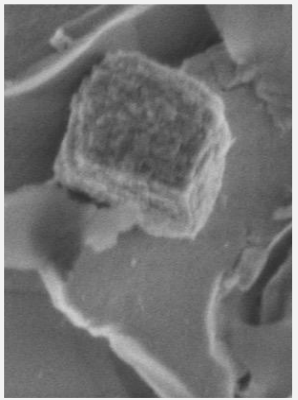
Delivery

The CO_2 is delivered to concrete plants by gas suppliers and stored in pressurized tanks



Injection

CarbonCure's technology delivers a precise, automated dosage of CO_2 into mixing concrete



Mineralization

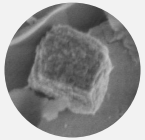
The CO_2 converts into nano-minerals that become permanently embedded in the concrete

What Happens When CO_2 is Injected?

Cement + H_2O → Ca^{2+} Calcium

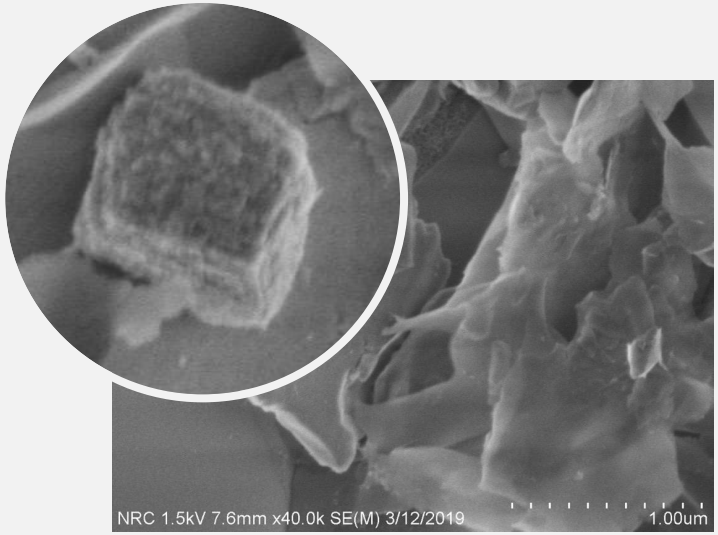
CO_2 + H_2O → CO_3^{2-} Carbonate

Ca^{2+} + CO_3^{2-} = $CaCO_3$ Calcium Carbonate



- Reverse calcination reaction occurs
- CO_2 converts into **$CaCO_3$ (solid limestone)**

Converting CO_2 to a Mineral



Carbonate product formed
about 400 nm dimension

Nano-calcium carbonate particles act as nucleation sites for hydration. Compressive strength benefits arise from this interaction, enabling concrete producers to reduce cementitious content.

CO_2 has a Neutral Impact on...

Fresh Properties

- Setting time
- Workability/slump
- Concrete pumping
- Air content
- Temperature
- Finishing

Hardened Properties

- Freeze-thaw
- pH
- Density
- Durability
- Color
- Texture

Note: Peer reviewed papers are available to support the above information at carboncure.com.

CarbonCure for Ready Mix

How Much CO_2 Can Be Saved?

20-35 lbs CO_2 saved per yd^3

CO_2 saved = CO_2 mineralized + CO_2 avoided by reducing cement

Reference Projects

Atlanta, GA – 725 Ponce
Concrete Producer: Thomas Concrete
CO_2 Saved: 1,500,000 lbs

Mountain View, CA – LinkedIn Campus
Concrete Producer: Central Concrete
CO_2 Saved: 240,000 lbs

Indianapolis, IN – Infosys Innovation Hub
Concrete Producer: Irving Materials
CO_2 Saved: 240,000 lbs

Calgary, AB – East Deicing Apron
Owner: YYC Calgary International Airport
CO_2 Saved: 352,740 lbs (160 tonnes)

Chicago, IL - McDonald's Flagship
Concrete Producer: Ozinga
CO_2 Saved: 30,000 lbs

Lebanon, TN – Cedar Creek Distribution
Concrete Producer: Irving Materials
CO_2 Saved: 140,000 lbs

Atlanta, GA – Georgia Aquarium
Concrete Producer: Thomas Concrete
CO_2 Saved: 330,000 lbs

Arlington, VA – Amazon HQ2
Concrete Producer: Miller & Long
CO_2 Savings (est.) : 2,500,000 lbs

Reference Project:

Kapolei Interchange - Honolulu, HI

Concrete paving, Department of Transportation highway

"I am pleased to see HDOT moving ahead with CarbonCure, local concrete companies, and Hawaii Gas to reduce the levels of carbon dioxide emitted during the construction process."

David Ige
Governor of The State of Hawai'i

Supplier:
Island Ready Mix

Specifier
Hawaii Department of Transportation

Project Size:
150 cubic yards

CO_2 Savings Equivalent:
1,500 lbs

DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

The Future of Carbon Utilization

Build for the Future.
Build with CarbonCure.

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