

CARBON CONCRETE ADMIXTURE



EdenCrete[®]

ASTM C494, Type S Admixtures

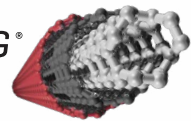
TOUGHER STRONGER CONCRETE

Harness the abrasion resistance and bonding strength of carbon nanotubes for your next pour.

Developed by Eden Innovations LLC, **EdenCrete®** is a carbon nanotube-enriched liquid admixture that elevates concrete structures to new levels of strength and toughness. The overall durability impact is achieved through the performance improvements in abrasion resistance, permeability resistance, shrinkage reduction, and strength [e.g. compressive, flexural, and split tensile]. Fresh properties are also improved, aiding in pumping and finishing, further reducing life-cycle costs.

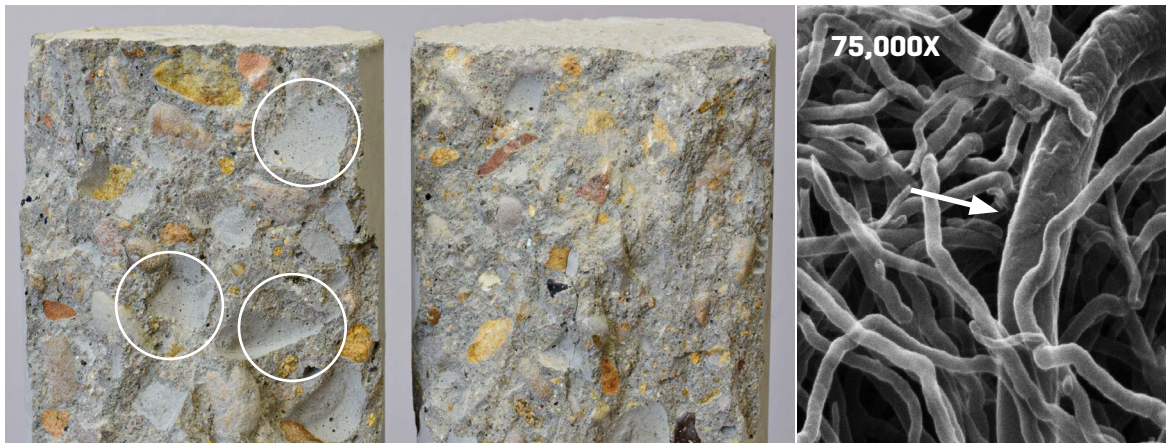
EdenCrete® and EdenCrete P_Z® have been tested in strict accordance with ASTM C494 [AASHTO M194] under AASHTO's NTPEP program, and both qualify as a Type S chemical admixture.

CARBON STRONG®



How does EdenCrete® make concrete tougher?

Good question. When added to concrete mixtures, carbon nanotubes in **EdenCrete®** fill in spaces at the nanoscopic level by bonding to hydrated cement particles. When concrete cures, instead of leaving porous openings that would allow water to penetrate or cracks to develop, **EdenCrete®**'s nanotubes create millions of flexible, strong carbon bonds throughout the structure. These carbon bonds greatly improve resistance to failure caused by compressive, flexural, tensile, and impact forces, as well as improve resistance to abrasive wear and crack propagation. All of the benefits of **EdenCrete®** work together to make concrete more durable, resulting in longer life for the concrete application.



Concrete Pullout **without EdenCrete®**. Notice the flat, smooth areas where aggregate has pulled out of the cement paste. The concrete fails before the aggregate.

Concrete Pullout **with EdenCrete®**. Notice the aggregate fractures before the concrete bond fails.

EdenCrete® carbon nanotubes form denser bonds at the molecular level. The arrow is pointing at a carbon nanotube bonded with hydrating cement.

The strength of carbon fiber—now available in concrete.

What exactly are carbon nanotubes? These nanoscopic cylinders of carbon, barely 1/50,000th the diameter of a human hair, have revolutionized dozens of industries and thousands of products from aerospace applications to electronics to sporting equipment. Why? Carbon nanotubes are ounce for ounce 117 times stronger than steel and 30 times stronger than bulletproof Kevlar, yet extremely light. Carbon nanotubes create enhanced bonds at the interfacial transition zone between the cement paste and the aggregate, resulting in superior pullout capacity and greater aggregate fracture when failure is reached. Simply put, the aggregate breaks before the concrete does.

EDENCRETE[®] PRODUCT LINE



EdenCrete[®] - The Original Carbon Concrete Admixture

Makes Stronger, Tougher Concrete

EdenCrete[®] is a carbon-enriched, liquid admixture which improves the rheology, strength, and durability of concrete. **EdenCrete[®]** enhances the performance of your existing mix design to provide elevated levels of strength and resistance to abrasion, while reducing shrinkage cracking and permeability.



EdenCrete P_z[®] - Pozzolanic Mixes

Increases Cement Efficiency, Optimizes Pozzolanic Mixes

EdenCrete P_z[®] improves the performance of concrete mixes with pozzolans [i.e. fly ash or slag] as a replacement for cement. **EdenCrete P_z[®]** is used to extend the service life of concrete and boost early-strength loss commonly associated with using pozzolans.

Works well with other concrete admixtures.

EdenCrete[®] can be used in mixes containing any of the various admixture chemistry types commonly found in the market. **EdenCrete[®]** does not require altering formulations or procedures to get the desired performance from the mix design, however, we frequently work with the customer to optimize the mix design for the use of **EdenCrete[®]**. It offers a wide range of compatibility for contractors, architects/engineers, and ready mix companies.

Excellent workability.

EdenCrete[®] improves the rheology and crack resistance of concrete, making it a good replacement, or partial substitution, for traditional fibers. Using **EdenCrete[®]** with less fibers, or no fibers, will significantly improve the ability of the mix to be pumped, placed, and finished without needing additional water.

Add life to your structures.

Contractors, architects, engineers, and producers are learning that **EdenCrete[®]** can extend the life of their concrete. Differentiate yourself from the rest of the field by offering an innovative product like **EdenCrete[®]**, setting you apart with a competitive advantage.

Tested for consistent, reliable results.

EdenCrete[®] has undergone extensive research and development, laboratory testing, and field trials around the globe. Implemented by Departments of Transportation, Engineers, Contractors, and Concrete Producers, **EdenCrete**[®] is used to improve a growing list of municipal, commercial, and residential applications. From ready-mix in slab on grade and paving, to shotcrete for walls, bridge reinforcement, and suspended applications, **EdenCrete**[®] continues to disrupt markets where traditional concrete performance has proven to be inadequate. Make your concrete Carbon Strong[®] with **EdenCrete**[®] to improve the durability and performance of your next concrete project.

THE FUTURE OF CONCRETE

Special Applications

EdenCrete[®] offers advantages for any pour, but here are some specific applications and problems that **EdenCrete**[®] can mitigate...

When you need a tougher surface...

When pouring premium sidewalks, driveways or roadways that need to stand up to abrasion, **EdenCrete**[®] delivers superior protection.

When you need durability and resistance to aggressive in-service conditions...

EdenCrete[®] creates a tougher, more durable concrete mix that may allow architects/engineers to specify less steel reinforcement or thinner concrete slab pours.

When water and corrosion are a concern...

EdenCrete[®] reduces the permeability of concrete to mitigate the ingress of moisture, making it ideal for use in infrastructures such as water distribution, bridges, piers, dams, and locks.

When Shotcrete needs to pump without segregating...

Use **EdenCrete**[®] to improve how shotcrete is pumped, shot, and carved. **EdenCrete**[®] mixes allow a lower hydraulic pressure which aids movement through the pump and hose, reducing dust and waste from rebound.

Advantages for Specific Applications

■ Residential

Homeowners use **EdenCrete**® to reduce permeability and combat cracking from shrinkage and recreational vehicle loads. This helps mitigate the ingress of moisture and deicer chemicals, which helps reduce damage due to freeze/thaw cycles. Many customers use **EdenCrete**® as a partial substitution for, or in lieu of micro-fibers, improving workability and finishing operations to get the crew on to the next job, sooner. Mixes receive integral and topically applied color very well, and the improved integrity of the hardened cement paste maintains the definition necessary to produce a high-quality stamped finish.

■ Commercial and Industrial

Commercial and industrial applications use **EdenCrete**® to improve concrete durability in extreme service conditions. This is accomplished by increasing resistance to abrasion, strength, and surface hardness, and reducing impact damage, curling and cracking from shrinkage, and permeability. Incorporating **EdenCrete**® into the mix helps extend the service life of the concrete before maintenance or replacement projects are required.

■ Municipalities, Transit, and Public Works

Public Works departments use **EdenCrete**® to extend the service life of concrete in city locations with high volumes of passenger and heavy commercial vehicles, particularly where deicer chemicals are used to keep the roads safe during winter weather conditions. Using **EdenCrete**® reduces the damage from deicer chemicals, helping to make annual budgets stretch further while maintaining safe roadways for the motoring public.

■ Departments of Transportation

Departments of Transportation (DOT) use **EdenCrete**® to improve durability and resistance to abrasion and cracking in roadway and bridge applications. **EdenCrete**® is a great fit for DOT projects, particularly in areas where traditional concrete has failed due to growing volumes of traffic, heavy-vehicle loads, and aggressive in-service conditions.

■ Pumping Ready-Mix

Contractors who pump ready-mix concrete use **EdenCrete**® because the mix moves more easily through the pump and the hoses, allowing difficult mixes to pump further and higher without segregation or clogged hoses. **EdenCrete**® mixes glide through the longest of rigid booms, even when attached to an additional few hundred feet of flexible hose. Contractors save time and money by not having to move the pump during large placements, potentially delaying finishing operations.



ABRASION



COMPRESSIVE



DEICER



FINISHING



FLEXURAL



LIFE COST



PERMEABILITY



RHEOLOGY



SHRINKAGE



TENSILE

■ **Shotcrete**

EdenCrete® improves both fresh and hardened properties of shotcrete. During placement, it improves the rheology of the paste and making it easier to pump and shoot without segregation and/or sand packing. Typically, pump operators reduce the hydraulic pressure when shooting **EdenCrete®** mixes from ~3800 to ~2400 psi. The improved consistency of the paste adheres better to the contact surface, resulting in less dust and wasted material from rebound. When the pump operates at a lower hydraulic pressure, it reduces fuel costs and wear and tear on the pump. After placement and carving, **EdenCrete®** provides strength and durability to the finished product, reducing the development and propagation of cracks. **EdenCrete®** is regularly used by contractors as a partial replacement for, or in lieu of, traditional micro-fibers in shotcrete mixes.

■ **Surface Hardening**

Because **EdenCrete®** is integral, it improves concrete throughout its entire depth while also creating a tougher, stronger surface that is more resistant to abrasion from forklifts, passenger and commercial vehicles, etc. Used as an alternative to dry-shake, metallic hardeners, **EdenCrete®** saves a significant amount of material and labor costs, improves worker safety on the jobsite, and extends the concrete durability when exposed to aggressive service conditions. Save yourself the extended time on the jobsite waiting to install a dry-shake, metallic hardener. Pour in the Strength® at the plant with **EdenCrete®**.



**Get the most out of EdenCrete®.
Contact us today.**

Our **EdenCrete®** admixture specialists look forward to answering your questions about this innovative product. Whether it concerns special applications, mix design optimization, or dosage recommendations for your project, please contact our **EdenCrete®** team. We offer free consultation and complimentary samples for your initial testing.

EdenCrete® Proudly Supports the Following Associations



american
shotcrete
association

asa



WHAT OUR CUSTOMERS THINK

“ *It was the hardest concrete any of us have ever attempted to demolish...*”

Brett Cooper
Vice-President of Construction
Two State

eden Innovations
that work.™

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*Eden Innovations LLC is a subsidiary of
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