

Carbon nanotube-enriched liquid concrete additive

Uses

EdenCrete® Pz™ is used in pozzolanic designed ready-mixed concrete to increase cement efficiency and optimise hardened concrete properties for:

- Normal and special class concrete
- Precast concrete
- Concrete beams and suspended slabs
- Infrastructures such as water distribution, bridges, dams, roads, ports
- Concrete pavements, commercial and industrial concrete floors, airport runways, driveways

Advantages

Depending on the type of concrete mix design, concrete raw materials, application and related conditions the following can be achieved:

- Aids to reduce the cement content in pozzolanic concrete mix designs, whilst maintaining design strength
- Improves tensile and flexural strength
- Improves compressive strength
- Improves modulus of elasticity
- Improves cracking resistance
- Improves drying shrinkage
- Reduces Chloride ion penetration
- Reduces water permeability

Description

EdenCrete® Pz™ is a carbon nanotube-enriched concrete liquid additive developed as a concrete performance enhancer. It contains millions of nanoscopic carbon cylinders, that elevate concrete structures to improved levels of strength and durability.

Carbon nano-tubes are strong, light and flexible and create enhanced bonds at the interfacial transition zone between cement paste and the aggregate.

Technical support

Parchem provides a technical advisory service for on site evaluation and advice on use of EdenCrete® Pz™ additive, dose rate determination, evaluation trials and dispensing equipment. Technical data and guidance can be provided for the additive and concrete admixture products, for use together with fresh concrete.

Properties

Typical values

Appearance:	Black liquid
Colour:	Black
Density at 20°C:	1.15 (± 0.02) kg / litre
pH value:	11.6 ± 1.0
Chloride content:	None added
TEA content:	Yes

ASTM Testing

EdenCrete® Pz™ has been tested in 3rd party laboratories according to the following ASTM Test Standard:

Compressive Strength	ASTM C39
Flexural Strength	ASTM C78
Modulus of Elasticity	ASTM C469
Permeability – chloride ion	ASTM C1593
Tensile Strength	ASTM C496

Application Instructions

EdenCrete® Pz™ can be used in a dry-batch or central plant mixing process and are dispensed into the truck simultaneously with concrete admixtures. If added to a ready-mix truck in any other sequence, ensure a minimum of 70 revolutions at maximum rpm before placing concrete on the ground.

For initial evaluations of EdenCrete® Pz™ into a new concrete mix, subtract the full weight of the additive dose from the design water and reserve an additional 2% of the remaining mix water. It may be necessary to add the entire amount of remaining mix design water to achieve the slump specification for the job, but some mixes are able to slightly reduce the water content and still meet the required slump.

When designing concrete, refer to the properties and typical dosage rate.

EdenCrete® Pz™ should be added as near to the end of the mixing sequence as is possible, after all of the raw materials and after cement is wet out to help achieve maximum dispersion and efficacy.

The addition of EdenCrete® Pz™ to dry materials in the mixer will impede performance and is not recommended

Typical Dosage

For each application the dose rate of EdenCrete® Pz™ is best established by trial mixes with the same raw materials in use under conditions that will be experienced on site.

The typical dosage range is between 125ml – 2.5 litres per m³, depending on the specific mix design.

This will ensure the adequate concrete mixture proportions are consistent with the concrete properties needed.

EdenCrete® Pz™

Laboratory and site trials are recommended to determine the actual dose rate.

For dosages outside of manufacturers recommendations, please contact your Parchem representative.

Dispensing

The correct quantity of EdenCrete® Pz™ should be measured by means of a suitable dispenser.

Compatibility

With cements

EdenCrete® Pz™ is suitable for use with combinations of GP cement, fly ash, slag and silica fume. The additive is compatible with supplementary cementitious materials to aid in the reduction of GP cement in combination pozzolanic concrete mix designs.

The quantity of both the GP cement and the supplementary cementitious materials in the concrete mix design is recommended to be determined by laboratory trials.

With other admixtures

EdenCrete® Pz™ is compatible with most chemistry-type concrete admixtures commonly used.

A combined dose of EdenCrete® Pz™ and EdenCrete® HC™ may be required for ultimate performance enhancement in pozzolanic combination concrete mix designs, where increased abrasion resistance and reduced permeability is desired.

Please refer to the EdenCrete® HC™ TDS and contact your Parchem representative.

It is recommended to conduct laboratory trial mixes with the same raw materials and concrete mix design.

Contact the Parchem Technical Department for further advice on the compatibility of EdenCrete® Pz™ with various concrete admixtures.

Supply

EdenCrete® Pz™ 1000 litre IBC:	FC304100-1000L
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EdenCrete® Pz™ 200 litre:	FC304100-200L
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EdenCrete® Pz™ 17 litre:	FC304100-17L
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EdenCrete® Pz™ 4 litre:	FC304100-4L
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Shelf life

EdenCrete® Pz™ has a minimum 12 month shelf life from the date of manufacture, when stored, handled and transported per the guidelines.

Storage

EdenCrete® Pz™ should be transported and stored at a temperature of -5 to 50° C). If frozen, thaw and agitate thoroughly to return product to normal state. For bulk storage, the additive tank should be composed of polypropylene or high-density polyethylene (HDPE). The storage tank should be sealed after the EdenCrete® Pz™ is added.

Do not store containers in direct sunlight.

Dispensing and Recirculation System Equipment

- Utilise pumps composed of stainless steel, nylon, HDPE, or polypropylene with internal seals composed of PTFE/ Teflon, SBR/Buna-S, EPDM synthetic rubber, or neoprene.
- Utilise industrial rubber hose with EPDM, SBR, or PTFE liner material.
- Do not utilise dispensing equipment or recirculation equipment that is designed for or has been used to dispense EdenCrete® HC™. The 2 products are not compatible to be mixed together in their liquid form and may reduce the shelf life of the stored product..
- Do not use aluminum, unlined steel, or fiberglass tanks.
- Do not use iron, copper, brass, or bronze components in contact with EdenCrete® Pz™.
- Do not use PVC plumbing (CPVC is acceptable). Do not use silicone, FKM/Viton, or NBR/Buna-N seals.

Recirculation Guidelines

It is recommended to stir product before shipping, before transferring from one container to another container and before using in concrete. This is accomplished by:

- **Tote:**
 - Utilise a portable drill with a spiral stirrer long enough to reach the bottom of the tote (≥ 725 mm) length)
 - Stir the product for 15 minutes, moving the stirrer around to ensure the contents will be evenly mixed
- **Small containers:**
 - Thoroughly mix or shake the container before use

Health and Safety

EdenCrete® Pz™ contains no hazardous substances requiring labelling. For further information refer to the Safety Data Sheet.