**EverCRETE**

**CO₂-resistant cement system**

Extend cement barrier lifetime in reservoirs containing CO₂

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**Temperature:**

up to 130 degC [266 degF]

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**Applications**

- Carbon capture and storage wells
- Wells in fields that use CO₂ injection for enhanced oil recovery (EOR)
- Primary cementing in CO₂ environments
- Long-term decommissioning objectives for plug and abandonment (P&A) in CO₂ environments

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**How it improves wells**

Because of its intrinsic low permeability, EverCRETE® CO₂-resistant cement system resists cement matrix attack from wet supercritical CO₂ and water saturated with CO₂ conditions. Accelerated reaction kinetics lead to a stabilized matrix within days of exposure to the CO₂ environment, leading to stabilized mechanical properties.

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**How it works**

EverCRETE system blends can be prepared locally using the standard bulk plant. The density can be tailored to well requirements, providing operational flexibility. Unlike other offerings, EverCRETE system is compatible with portland cement. The EverCRETE system can be used as a cement across potential CO₂-producing formations or as the primary barrier in the wellbore for any in situ fluids, with a portland cement-based slurry used as a filler slurry for coverage of remaining casing. It can be prepared and pumped using standard equipment. Additionally, the cement can be engineered with self-healing properties that are reactive to CO₂ exposure.

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**What it replaces**

Portland cement systems are used conventionally for zonal isolation in wells. However, portland cement is thermodynamically unstable in CO₂-rich environments and can degrade rapidly upon exposure to CO₂ in the presence of water. As CO₂-laden water diffuses into the cement matrix, the dissociated acid (H₂CO₃) reacts with the free calcium hydroxide and the calcium silicate hydrate (C-S-H) gel. The reaction products are soluble and migrate out of the cement matrix. Eventually, the compressive strength of the set cement decreases and the permeability and porosity increase, leading to loss of zonal isolation.

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**Why it’s ideal in any CO₂ environment**

Well integrity has been identified as the biggest risk contributing to leakage of CO₂ from underground carbon capture and storage sites. EverCRETE system enables efficient underground storage and keeps greenhouse gases out of the atmosphere for a long time.

For wells in fields that use CO₂ injection for EOR or may use it in the future, EverCRETE system reduces the risk of cement sheath degradation and leakage. It can be used to cement new CO₂ injection wells or to plug and abandon injection or production wells at the end of the field life.

EverCRETE system can also be used as a cement across potential CO₂-producing formations or as the primary barrier in the wellbore for in situ fluids after abandonment and permanent decommissioning.

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**Compressive strength evolution of portland cement and EverCRETE system samples with time in wet supercritical CO₂ fluid and in CO₂ saturated in water at 90 degC under 28 MPa of pressure. After 6 months in CO₂-saturated water, the compressive strength of portland cement is not measurable because most of the samples are highly deteriorated. The stability of the EverCRETE system minimizes the degradation potential of the long-term barrier.**