

Flexible self-healing cement system

Reduces emissions due to lower embodied carbon and by eliminating hydrocarbon leaks

Applications

- Wells with potential risk of
 - Hydrocarbon migration
 - Sustained casing pressure (SCP)
 - Postplacement pressure and temperature variations (e.g., because of injection, hydraulic fracturing, or underground gas storage)
- Oil and gas wells in environmentally sensitive areas
- Primary cementing, plug and abandonment cementing, or both

Benefits

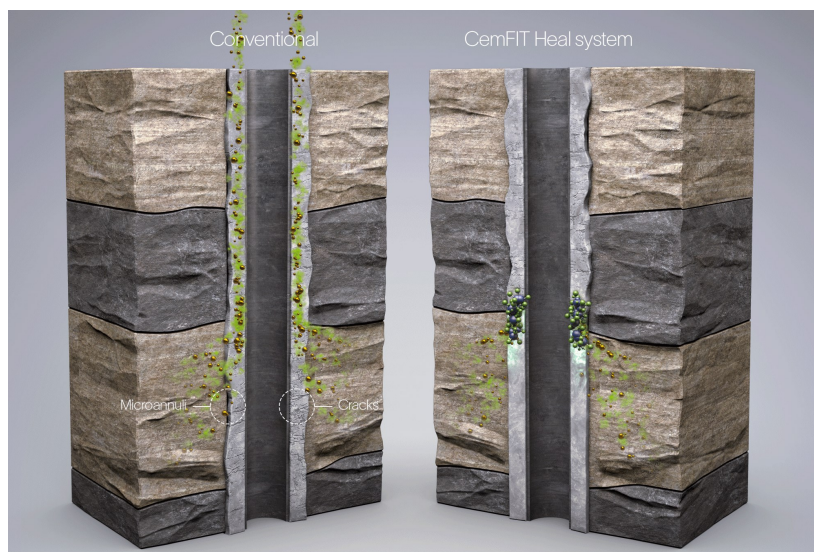
- Improves long-term well integrity by resisting set-cement-sheath failure
- Reduces risk of
 - Annular pressure buildup
 - Mechanical well damage
 - Collapsed casing
 - Cement tensile cracks
 - Cement debonding
 - Costly remedial cementing jobs and lost production
- Extends production life of the well by autorepairing cement cracks and microannuli that cause hydrocarbon leaks
- Minimizes or eliminates the need to monitor wells after decommissioning

Features

- Low Young's modulus for greater flexibility
- Ability to autorepair on contact with hydrocarbons, even in dry gas
- Standard designs for a wide range of densities and temperatures
- Suitable for both batch mixing and mixing on-the-fly, using conventional equipment.

Emissions Reduction

- Eliminates hydrocarbon leaks
- Lowers embodied carbon by lessening dependency on cement



Conventional cement barriers (left) can develop cracks and microannuli caused by pressure changes and other stresses, allowing fluids to flow between zones and rise to the surface. The CemFIT Heal system (right) responds to any contact with oil or gas by automatically repairing and sealing itself.

Achieve zonal isolation for the life of the well

CemFIT Heal™ flexible self-healing cement system helps ensure well integrity from drilling to abandonment, providing a competent annular pressure seal and protecting against hydrocarbon leaks and SCP at the wellhead. This versatile, advanced product is the only cement system in the industry that not only has the mechanical properties to withstand wellbore stresses, but should any isolation defects appear, it repairs itself on contact with oil or gas irrespective of methane content.

Unlike conventional cement systems, the CemFIT Heal system exhibits low Young's modulus that enables the set cement to withstand stresses caused by

- drilling
- perforating
- injection
- hydraulic fracturing
- underground gas storage
- temperature changes
- pressure changes

while maintaining the cement sheath integrity. On top of this inherent feature, an additional expanding feature can be added to the CemFIT Heal system.

In the event of a hydrocarbon leak caused by cement-sheath failure (crack or microannulus), the set cement responds on contact with hydrocarbons and autorepairs the pathways, restoring the hydraulic integrity of the well. The self-healing action is repeatable if annular integrity is again compromised during the life

of the well. These properties have been conclusively demonstrated in the laboratory and during field testing.

For well decommissioning, the CemFIT Heal system delivers a robust, long-term barrier after abandonment with set cement properties favoring flexibility and durability, along with the inherent ability to self-seal should any isolation defects occur.

Deploy with ease

The cement job is simple to design, with one standardized concentration of the self-sealing additives for an oil environment and another for gas. Blend, solid-volume fraction, and slurry properties can be easily adjusted for optimal results to accommodate changes to cement designs and job programs. Because the CemFIT Heal system is easy to blend and mix using conventional equipment, it's suitable for large-scale use. The increased efficiency and higher reliability reduce NPT.

CemFIT Heal Specifications

Specifications	CemFIT Heal System
Density range	1320 to 1940 kg/m ³ [11 to 16.2 lbm/galUS]
Temperature range	21 ± 177 degC [70 ± 350 degF]
Hydrocarbon activation	Oil Any type of gas, even dry gas

All values are for standard specifications and are subject to change without notice.