

# Engineered Composite Pill Systems

Enhance wellbore coverage

## Applications

Temporary near-wellbore isolation for acid fracturing, matrix acidizing, scale control, sand consolidation and conglomeration, and water or gas conformance service treatments in

- unconventional or conventional formations
- new completions
- producers or injectors
- refracturing operations
- poorly cemented completions
- compromised casing situations
- cased-hole wells with perforations or jetted slots
- slotted liner screens
- openhole completions

## How it improves stimulation operations

Engineered composite pill systems for the OpenPath Sequence\* diversion stimulation service improve well production by diverting stimulation fluids into target zones. These systems

- leave no residue after degradation
- deliver reliability in plugging performance, irrespective of aperture and configuration of heterogeneities
- provide wellsite efficiency.

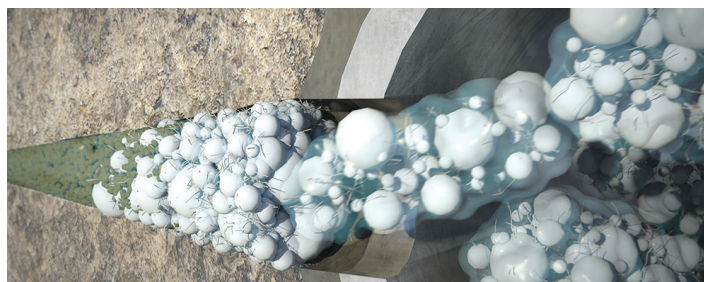
Several composite pill systems are available to suit most stimulation requirements.

## Features

- Engineered composite pill to ideally suit reservoir and completion characteristics
- Blend of fibers and particulates to optimize plugging and diversion
- Suitability for downhole temperatures ranging from 70 to 350 degF [21 to 177 degC].
- Ability to withstand differential pressure up to 4,500 psi [31 MPa]

## High-rate operations

The standard engineered composite pill system comprises a proprietary blend of degradable fibers, particles with tetramodal size distribution, and a delivery fluid. The standard pill is designed so that the large particles are intercepted at the entrance of a fracture, while smaller particles reduce permeability to create temporary isolation. The fibers ensure the integrity of the blend from surface to near-wellbore area and enhance the bridging mechanism.



*Standard and L-system composite pills.*

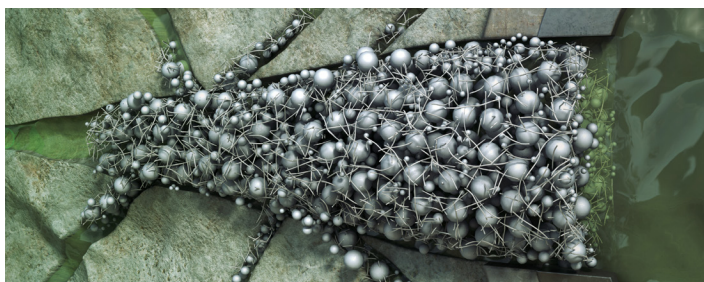
The L-system composite pill comprises a proprietary blend of large particles in an optimized fluid. The larger particles are able to successfully plug large fractures, caverns, and etched space in the near-wellbore area.

Temperature and hydrolysis activate the degradation of the standard and L-system composite pills, eliminating the need for further intervention. The pill components are made of polymers that degrade without leaving any residue. The standard and L-system pill formulations are applicable in formations ranging from 130 to 300 degF [54 to 149 degC].

## Matrix or coiled tubing operations

The engineered M-system composite pill combines degradable particles with tetramodal size distribution, fibers, and a carrier fluid that degrades in the presence of hydrocarbon. The pill significantly reduces stimulation fluid leakoff and bridges natural fractures, resulting in superior diversion.

The M-system pill is applicable in formations ranging from 150 to 350 degF [65 to 177 degC].



*M-system composite pill.*

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## Limited-entry applications

The engineered S-system composite pill comprises unimodal particulates in a carrier fluid that degrades in the presence of hydrocarbon. This pill is designed to pass through the completion and accumulate in a perforation or along an open hole. The S-system composite pill is applicable in formations ranging from 150 to 250 degF [65 to 121 degC].



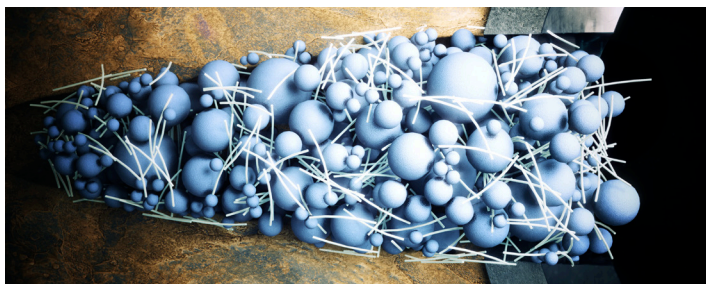
*S-system composite pill.*

## Ultralow-temperature (ULT) stimulation applications

The ULT-system composite pill is made of a proprietary blend of dissolvable particles to improve near-wellbore diversion in formations with temperatures below 140 degF [60 degC]. The result is much more rapid flowback and production as compared with waiting for conventional diverters to degrade. Dissolution timing for the ultralow-temperature diverter technology is tunable, which gives operators flexibility during acid stimulation operations.

The ultralow-temperature diverter technology can be combined with degradable fibers to improve pill transport and prevent dispersion of the particles to ensure consistent isolation.

ULT-system composite pill is optimal for formations with temperatures ranging from 70 to 140 degF [21 to 60 degC].



*ULT-system composite pill.*

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