

Case Study
i-Frac CEM™

i-Frac CEM 5 1/2 in. cemented sleeve installation 18 stages with 4 sleeves per stage, using dissolvable frac balls



i-Frac CEM™ - Dissolvable Frac Balls

Background

One of our customers operating in the Marcellus formation planned a 4,572 m (15,000 ft) horizontal well and needed an efficient fracture stimulating treatment during the completion. After the completion process, the operator was aware that a coiled tubing drillout would be required and an effective solution would be needed to avoid the drillout saving both time and money.



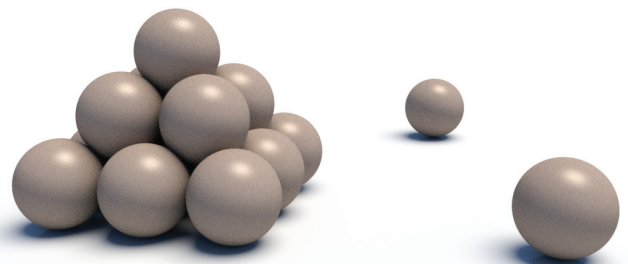
Dissolv-a-Ball frac ball technology work together with our open hole and cemented i-Frac sleeves to achieve optimal downhole zonal isolation, without the need for chemicals or mill outs/drill outs.

Solution

We designed an 18 stage completion using our i-Frac CEM sliding sleeve system, which employs a cost-effective, cemented in, ball drop-activated, multistage frac technology. The job design included the use of four sleeves per stage, in order to initiate four separate fractures. During the fracture treatment, dissolvable balls were used to operate the i-Frac sliding sleeves, allowing optimal downhole zonal isolation without the need for drillouts. For each stage, the ports were sized to achieve a sufficient limited entry effect in order to divert fluid to each of the four fractures.

The completion was designed as follows:

Stage one:	four sleeves per stage– 2.375 in. OD dissolvable ball
Stage two:	four sleeves per stage– 2.500 in. OD dissolvable ball
Stage three:	four sleeves per stage– 2.625 in. OD dissolvable ball
Stage four:	four sleeves per stage– 2.750 in. OD dissolvable ball
Stage five:	four sleeves per stage– 2.875 in. OD dissolvable ball
Stage six:	four sleeves per stage– 3.000 in. OD dissolvable ball
Stage seven:	four sleeves per stage– 3.125 in. OD dissolvable ball
Stage eight:	four sleeves per stage– 3.250 in. OD dissolvable ball
Stage nine:	four sleeves per stage– 3.375 in. OD dissolvable ball
Stage ten:	four sleeves per stage– 3.500 in. OD dissolvable ball
Stage eleven:	four sleeves per stage– 3.625 in. OD dissolvable ball
Stage twelve:	four sleeves per stage– 3.750 in. OD dissolvable ball
Stage thirteen:	four sleeves per stage– 3.875 in. OD dissolvable ball
Stage fourteen:	four sleeves per stage– 4.000 in. OD dissolvable ball
Stage fifteen:	four sleeves per stage– 4.125 in. OD dissolvable ball
Stage sixteen:	four sleeves per stage– 4.250 in. OD dissolvable ball
Stage seventeen:	four sleeves per stage– 4.375 in. OD dissolvable ball
Stage eighteen:	four sleeves per stage– 4.500 in. OD dissolvable ball



Case Study Snapshot

Challenges:

- 18 stage cemented completion with four sleeves per stage
 - Remove the need for plug-and-perf
 - Remove the need for coiled tubing drillout after completion
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Solution:

- Design the completion using i-Frac CEM technology
 - Use dissolvable frac balls to remove coiled tubing drillout requirements
 - 18 stages with four sleeves-per-stage, for a total of 72 sleeves
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Results:

- No problems encountered when installing and cementing the i-Frac CEM system
 - All sleeves shifted open as designed
 - No problem breaking through cement to initiate fractures
 - Reduced downtime as compared with plug-and-perf
 - Eliminated the need for coiled tubing drillout
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