

## Tartan Cemented Initiation Assembly Enables Reliable Toe Initiation and First Stage Stimulation in Extended Reach Horizontals

### OBJECTIVE

Operators using cemented plug-and-perf methods for their extended reach horizontals face the challenge of efficiently and reliably initiating stimulation operations at the toe. In addition to providing the initial flow path, operators are looking for a completion that can capture the pay zone at the toe – an area often left unstimulated.

Most toe initiation subs are not designed to provide a flow path capable of achieving the high rates required for stimulation of the formation. Complex toe sub designs can also be expensive and unreliable, resulting in additional remedial operations and expenses. Even if the toe sub opens, getting the first stage stimulation off by running plug and guns presents challenges due to the total depth, issues coming out of hole and the inability to achieve designed pump rates.

### SOLUTION

Tartan's Cemented Initiation Assembly is designed to enable operators to initiate through the toe at designed stimulation rates, pressure test the casing if desired, and perform a full first stage limited entry stimulation. By combining Tartan's patented Cemented Initiation Sub (CIS), Ball-Drop CIS and MultiFrac™ limited entry sleeves, the Initiation Assembly can be customized depending on the desired operational sequence.

The CIS and MultiFrac sleeves feature patent-pending BurstPoint™ ports that keep the system internals completely closed during installation and the cementing process, eliminating the risk of debris and cement invasion. The MultiFrac hydro-mechanical sleeves are activated with standard or dissolvable balls and enable cluster stimulation by opening multiple sleeves with one ball. Once the sleeves are shifted,

liner pressure is increased to fully open the BurstPoint ports to achieve communication with the formation.

### RESULTS

A large operator working in the D-J Basin installed Tartan Initiation Assemblies in two cemented wells on the same pad in Weld County, Colorado – one targeting the Niobrara formation and one targeting the Codell. Each Initiation Assembly comprised 2 CIS with 3 MultiFrac sleeves (Fig. 1 ). The operator had originally planned to use the CIS for flow initiation, but Tartan encouraged them to pump a full stage treatment to capture the pay zone at the toe.

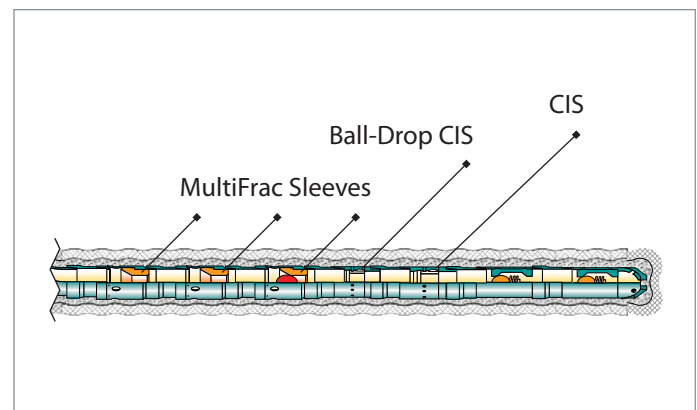


Fig. 1 – Cemented Initiation Assembly.

The uphole CIS was the Ball-Drop version to enable pressure testing of the casing string prior to stimulation operations, and a solid-seat was used for the last MultiFrac sleeve in the cluster. This configuration enabled stimulation through the 2 CIS as the toe stage and the 3 MultiFrac sleeves as the first stage.

A pressure truck went to location before the frac crew to pressure up the casing and open up the 2 CIS. After fluid feed rate was established, a dissolvable ball was pumped to the Ball-Drop CIS to conduct a casing pressure test. The full frac crew then came to location and successfully pumped 50-75% of the designed full stage proppant treatment at the toe stage through both CIS at 60 bpm (Fig. 2 ).

A large actuation ball was then pumped down to open the 3 MultiFrac sleeves, which were spaced out to provide an effective cluster stimulation. The first stage was completed using a limited entry stimulation design with a 95% cluster efficiency (Fig. 3 ). The remainder of the well was then completed using the plug-and-perf method.

The first stage stimulation was consistent between both wells, and had lower breakdown pressures than previous wells completed with plug-and-perf. The operator now uses Tartan’s Cemented Initiation Assembly as their standard operating procedure when drilling and completing new wells in the D-J Basin.

## ABOUT TARTAN COMPLETIONS

Tartan Completions is a multifaceted energy services company that engineers and manufactures innovative, customized multistage stimulation solutions and provides completions milling services globally. For over 20 years, Tartan has followed the philosophy of engineering our products with simplicity, reliability, flexibility and performance in mind, providing outstanding field service and value to our customers. From design to installation, we continue to meet the high expectations of our customers.

Please contact Tartan Completions for any of your downhole completion system and milling requirements.

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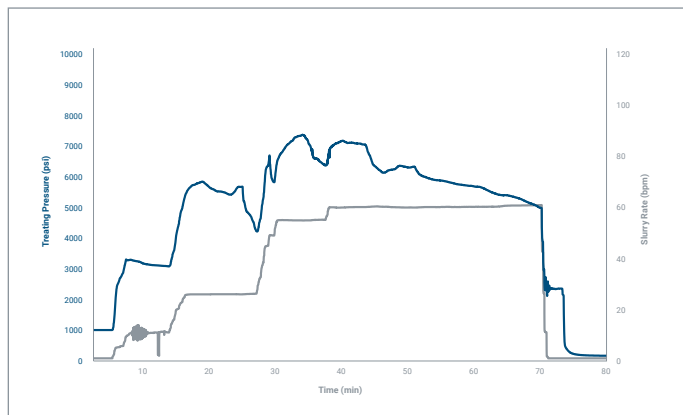


Fig. 2 – Treating pressure and slurry rate of CIS stage.

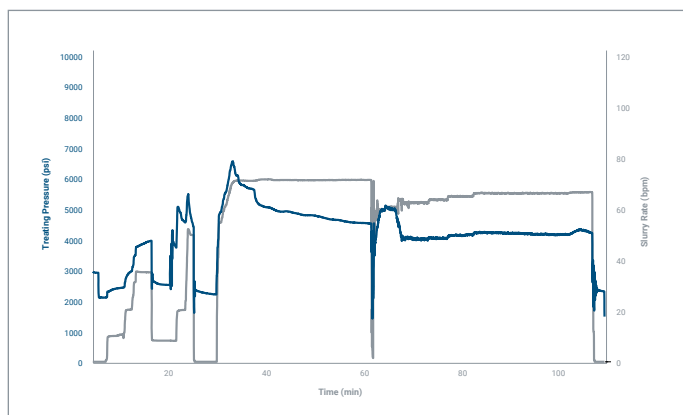


Fig. 3 – Treating pressure and slurry rate of MultiFrac stage.

