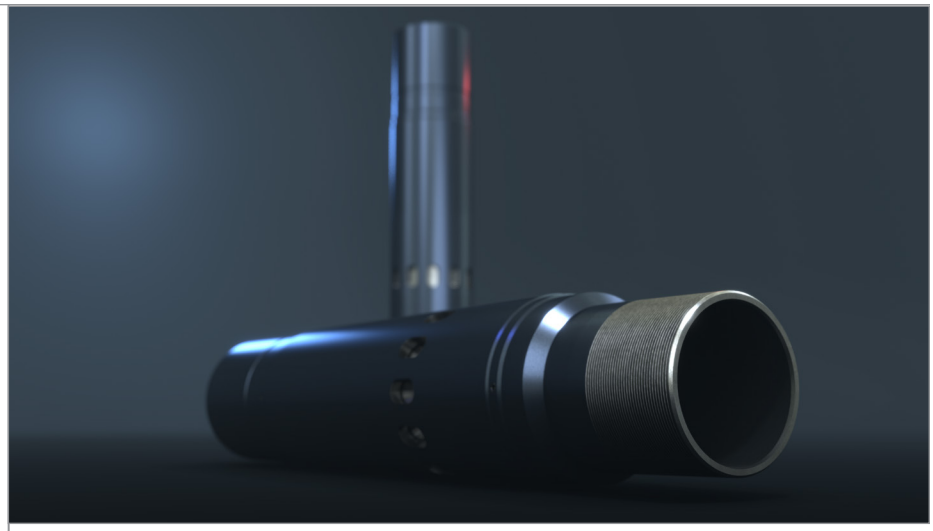
RECLOSABLE CT FRACTURING SLEEVE

CT Fracturing Sleeve

15,000 PSI
[103 Mpa]

285 ºF
[140 ºC]



APPLICATIONS

- Cemented multistage stimulation with single-entry fracture placement
- Openhole multistage stimulation, deployed with openhole packers

FEATURES

- Reclosable sleeve for cemented and openhole completions uses CT tension to open sleeves
- Premium coatings and scraping mechanisms are proven in the harshest thermal environments
- Large flow port area ensures access to fracture planes
- Fullbore has no effect on cementing or re-entry for subsequent stimulation
- Reliable shifting tool technology provides positive sleeve actuation
- Shifting tool is fail-safe opening and closing; only releases if the operator stops pumping or if the sleeve shifts
- Short length of sleeve facilitates handling and installation

Selective sleeve activation

The reclosable CT fracturing sleeve is part of a robust cemented or openhole fracturing system designed to allow operators to perform selective single-point multistage fractures. The sleeve is a two-position, fullbore, reclosable fracturing sleeve designed for the most common high-pressure and high-rate fractures. The inner sleeve is run in a pinned configuration and sheared when desired, providing positive indication that the specified port has opened before fracturing.

The sleeve can be opened, closed, and reopened, allowing operators to tailor production over the life of the well using the CT fracturing sleeve shifting tool. This has been accomplished through premium manufactured sealing technology, incorporating coatings and associated inner bore scraping mechanisms that have been proven in the harshest thermal environments. In addition, the sleeve utilizes an adjustable detent locking system that locks the sheared sleeve to prevent accidental manipulation and provides operators with reliable weight indicators to mark when the sleeve has shifted.

Positive sleeve actuation

The shifting tool that actuates the sleeve is compact (2.5 ft [0.8 m]), featuring a self-centralizing design with a 10,000-psi [69-MPa] pressure rating, and individual hydraulically controlled keys to ensure maximum performance during actuation up to 38,000 lbf [169,032 N] of overpull without releasing the sleeve unless desired.

The shifting tool has been engineered as a fracture-in-place solution with no requirements for isolation or related service tools, even after hundreds of stages are fractured. The fully compartmentalized and hydraulically balanced design with multiple layers of solids control ensures that no solids will interfere with the tool's operation.

Fail-safe operation

The shifting tool, in combination with the reclosable cemented fracturing sleeves' adjustable detent lock mechanism, provides operators with reliable surface indication of when a sleeve has shifted, determined by positive indication on the weight indicator combined with the release of the shifting tool. The shifting tool is designed to release the sleeve even when actuated only once the sleeve has shifted or once the operators have stopped pumping.

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FRACTURING SLEEVE PERFORMANCE SPECIFICATIONS

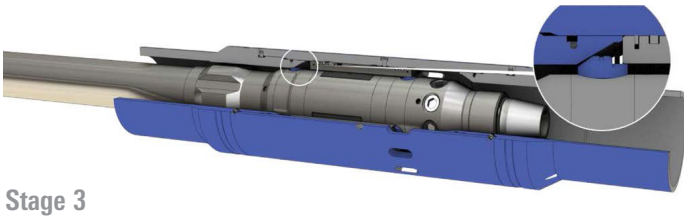
Casing Size in [mm]	**Casing Weight** lbm/ft [kg/m]	**OD** in [mm]	**ID**	**Sleeve Weight** lbm [kg]	**Length** in [mm]	**Up Position/ Lower Position**	**Fracture Port Area** in2 [cm2]	**Max Pressure** psi [MPa]	**Temp** F [C]	**Up Shift Weight** lbf [N]	**Down Shift Weight** lbf [N]
2.375 [60]	4.6 [6.84]	2.95 [74]	Casing ID	26.4 [11.9]	28.0 [711]	Stimulation/Closed	3.14 [20.25]	15,000 [103]	285 [141]	3,000 - 5,000 [13,344 - 22,241]	3,000 - 5,000 [13,344 - 22,241]
2.875 [73]	6.4 [9.52]	3.45 [88]	Casing ID	26.6 [12.0]	30.8 [782]	Stimulation/Closed	5.0 [32.25]	15,000 [103]	285 [141]	3,000 - 5,000 [13,344 - 22,241]	3,000 - 5,000 [13,344 - 22,241]
3.5 [89]	9.2 [13.69]	4.2 [107]	Casing ID	38.2 [17.3]	31.16 [791]	Stimulation/Closed	7.05 [45.48]	15,000 [103]	285 [141]	3,000 - 5,000 [13,344 - 22,241]	3,000 - 5,000 [13,344 - 22,241]
4.0 [101]	9.5 [14.13]	5.13 [130]	Casing ID	69.17 [31.3]	27.88 [708]	Stimulation/Closed	10.0 [64.51]	15,000 [103]	285 [141]	3,000 - 5,000 [13,344 - 22,241]	3,000 - 5,000 [13,344 - 22,241]
4.5 [114]	11.6 -13.5 [17.3 - 20.0]	5.5 [139.7]	Casing ID	69.17 [31.3]	27.88 [708]	Stimulation/Closed	11.20 [72.25]	15,000 [103]	285 [141]	3,000 - 5,000 [13,344 - 22,241]	3,000 - 5,000 [13,344 - 22,241]
5.0 [127]	15 [22.3]	6.0 [152]	Casing ID	70.0 [31.7]	30.0 [762]	Stimulation/Closed	11.94 [77.03]	15,000 [103]	285 [141]	3,000 - 5,000 [13,344 - 22,241]	3,000 - 5,000 [13,344 - 22,241]
5.5 [140]	17.0 - 20.0 [25.3 - 29.76]	7.0 [177.8]	Casing ID	149.82 [67.9]	34.34 [872]	Stimulation/Closed	11.94 [77.03]	15,000 [103]	285 [141]	3,000 - 5,000 [13,344 - 22,241]	3,000 - 5,000 [13,344 - 22,241]
6.0 [152]	20 [29.76]	7.5 [190.5]	Casing ID	160.0 [72.5]	34.5 [876]	Stimulation/Closed	30.2 [194.83]	15,000 [103]	285 [141]	3,000 - 5,000 [13,344 - 22,241]	3,000 - 5,000 [13,344 - 22,241]
6.625 [168]	24 [35.7]	8.0 [203]	Casing ID	170.0 [77.1]	36.0 [914]	Stimulation/Closed	30.2 [194.83]	15,000 [103]	285 [141]	3,000 - 5,000 [13,344 - 22,241]	3,000 - 5,000 [13,344 - 22,241]
7.0 [178]	29 [43.2]	8.75 [222]	Casing ID	180.0 [81.6]	36.0 [914]	Stimulation/Closed	30.2 [194.83]	15,000 [103]	285 [141]	3,000 - 5,000 [13,344 - 22,241]	3,000 - 5,000 [13,344 - 22,241]

Stage 1

A hydraulic differential extends the keys of the shifting tool. Even up to 10, 000-psi [69MPa] differential, the keys deflect the same amount and engage the sleeve.

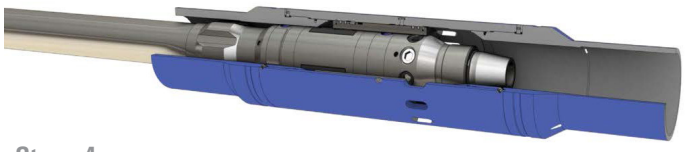
Stage 2

The leading key deflects over the sleeve. The grappling face of the rear key grabs the sleeve and the sleeve is pulled open, shearing the shear screw. Shifting indication is seen at surface.



Stage 3

The kickoff profile of the lead key hits the kickoff profile in the sleeve and both keys deflect the same amount to release the sleeve.



Stage 4

If the shifting tool releases while pumping when going through the sleeve, then the sleeve has shifted. The system was engineered to eliminate false positives.

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