

i-Opener TD-II Toe Sleeve

The i-Opener™ CEM TD-II (Time Delay) toe sleeve is a remotely actuated toe sleeve used to establish one or multiple circulation paths from the completion to the reservoir. The i-Opener TD-II is used as a time and cost-saving alternative to conventional toe perforating methods and applications requiring multiple pressure cycles and full casing pressure testing.

In multistage fracturing applications, the i-Opener TD-II can hydraulically frac the first stage and/or establish injectivity, allowing frac balls or plugs to be pumped to the lower completion. The ability to tailor the time delay mechanics to fit each application allows for short or long opening delays in a variety of pressures and temperatures. This capability allows for an unlimited number of highpressure cycles in heavy fluids to be performed without operating the i-Opener. After the required high-pressure operations are completed, the i-Opener TD-II can be opened at lower pressure and in lighter fluids where required.

The unique features of the i-Opener TD-II allow for multiple hydraulic pressure events in the well to set liner hangers and pressure test the liner and/ or upper completion without risking premature opening of the toe.

The i-Opener CEM TD-II is designed to allow validation testing according to ISO 14998, V0 rating, making it suitable for wells where the lower completion is required to be part of the well barrier. ISO 14998 ratings may be lower than stated ratings below.



Features and benefits

- Customizable time delay with the ability to have multiple time delay windows
- Infinite number of pressure cycles within each time delay window
- Fully compatible with either cemented or openhole completions
- Predictable flow area for establishing circulation Sleeve designed to be Barrier Qualified according to ISO 14998, V0 validation grade
- Decouples casing pressure test from flow initiation operation
- Allows multiple pressure cycles in the well over time without compromising liner integrity
- Can be run as part of a variety of multistage fracturing systems
- A sliding sleeve exposes all flow ports to the formation at once
- Large flow area flow ports for increased pumping efficiency and the ability to perform a toe stage frac
- Can be used as part of a barrier qualified lower completion to improve completion efficiencies
- Saves time and cost versus conventional toe perforating techniques

Applications

- Cemented and open hole completions
- Wells requiring casing integrity tests to maximum pressure
- Wells requiring multiple high-pressure events for pressure test or functioning tools
- Wells in which flow initiation pressure cannot exceed test pressure

i-Opener TD-II Toe Sleeve Specification

i-Opener TD-II Size	OD in. (mm)	ID in. (mm)	Length in. (m)	Burst psi (MPa)	Collapse psi (MPa)	Tensile lbf (daN)	Operating temp. °F (°C)	Absolute load/unload pressure per cycle psi (MPa)	Flow Area in ² (cm ²)
450	5.720 (145.29)	3.287 (83.49)	57.6 (1.46)	15,000 (103)	15,000 (103)	410,000 (182,377)	350 (176)	20,000 (138)	8.9 (57.42)
500	6.250 (158.75)	3.750 (95.25)	55.98 (1.42)	15,000 (103)	15,000 (103)	462,000 (205,508)	350 (176)	20,000 (138)	11.11 (70.97)
500	5.810 (147.57)	3.287 (83.49)	57.6 (1.46)	15,000 (103)	15,000 (103)	450,000 (200,170)	325 (163)	20,000 (138)	8.9 (57.42)
550	7.300 (185.40)	4.67 (118.62)	58.27 (1.48)	15,000 (103)	13,000 (90)	439,000 (195,277)	350 (176)	20,000 (138)	17.14 (110.58)