

Connex[®]

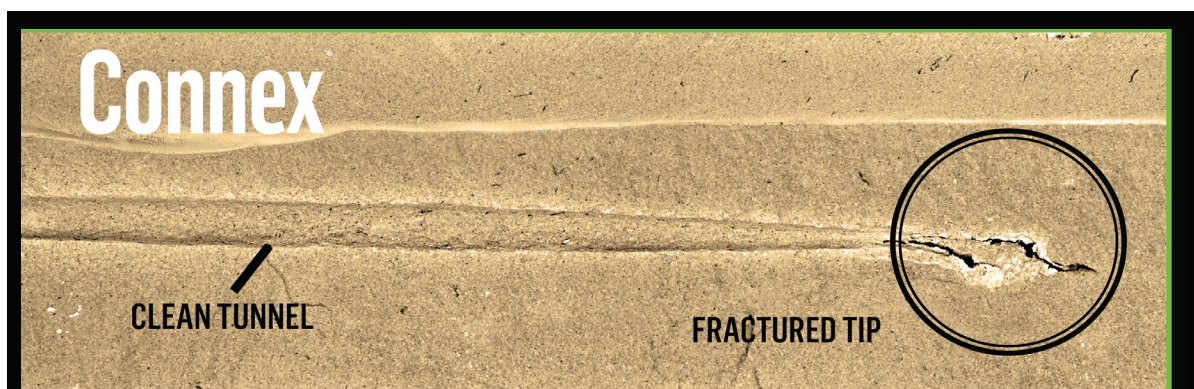
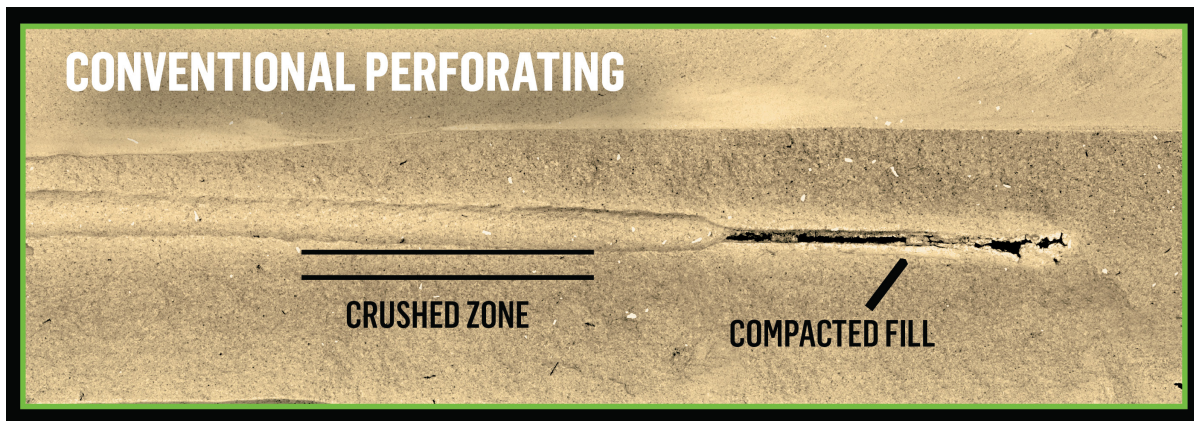
CLEAN TUNNELS FRACTURED TIPS



GEOdynamics[®]

Connex[®]

Connex[®] Clean Perforation Technology shaped charges deliver clean, open tunnels independent of rock type. Every tunnel receives its own cleaning action, independent of other perforations, resulting in a much greater percentage of clean tunnels and an ideal flow path between undamaged reservoir and the wellbore. Connex[®] is optimized for deployment in all GEODynamics' perforating systems.



Check out the dramatic improvement in tunnel geometry and quality delivered by Connex[®]. No more crushed zone. No more compacted fill, just a **wide, clean tunnel**. Note the **fractured tunnel tip**, a highly beneficial feature to inflow performance.

Connex[®] products deploy in standard hardware. Gun performance and wellbore integrity are unaffected. Penetration into stressed rock is equivalent to GEODynamics' industry-leading Razor[®] charges.

HOW IT WORKS

GEODynamics' Connex® charges use Clean Perforation Technology to clear out the compaction zone in a perforating zone. Patented charge liner material deposited along the tunnel cleans exothermically when introduced to heat and pressure. This cleaning action creates significant pressure within and around the tunnel, breaking up and expelling the crushed zone compacted debris back into the wellbore. In sufficiently competent rock, fractures are also formed at the tunnel tip.

SYSTEM ADVANTAGES

- Field proven to Eliminate or Dramatically Reduce Acid Volumes
- More Efficient Hydraulic Fracture Stimulation (treating rates + pressures)
- More Efficient Limited Entry Perforation
- Maximum Impact Workovers
- Profitable Completion of Heterogeneous Pay Zones
- High Performance Injection Wells
- Maximum Return from Mature Assets
- Multi-String Applications

SUPER DEEP PENETRATING

Carrier O.D.	Shaped Charge	Part Number	Perforating Condition	Explosive	Shot Density / Phasing	Casing O.D.	Performance in Concrete		Performance in Stressed Berea		
						Application	EHD (in)[cm]	TTP (in)[cm]	EHD^ (in)[cm]	TTP (in)[cm]	
1-9/16"	1503 Connex SDP	EC1-15A0321-RC	Fluid	3.2g, RDX	6 spf / 60°	2-7/8"			0.17 [0.43]	4.90 [12.45]	
		EC1-15A0322-RC		3.2g, HMX					0.17 [0.43]	6.80 [17.27]	
		EC1-15A0323-RC		3.2g, HNS					0.17 [0.43]	4.30 [10.92]	
1-3/4"	1705 Connex SDP	EC1-17A0521-RC	Fluid	5.1g, RDX	6 spf / 60°	4-1/2"			0.21 [0.53]	7.40 [18.80]	
		EC1-17A0522-RC		5.1g, HMX					0.21 [0.53]	8.70 [22.10]	
		EC1-17A0523-RC		5.1g, HNS					0.20 [0.51]	6.00 [15.24]	
2"	2007 Connex SDP	EC2-20A0721-RC	Fluid	6.8g, RDX	6 spf / 60°	2-7/8"			0.22 [0.56]	8.94 [22.71]	
		EC2-20A0722-RC		6.8g, HMX					0.22 [0.56]	9.37 [23.80]	
		EC2-20A0723-RC		6.8g, HNS					0.20 [0.51]	7.30 [18.54]	
	2007 Connex SDP XLS	EC2-20B0721-RC	In Fluid or Dry	6.5g, RDX					0.23 [0.58]	8.70 [22.10]	
		EC2-20B0722-RC		6.5g, HMX					0.21 [0.53]	9.80 [24.89]	
2-3/8"	2311 Connex SDP	EC2-23A1121-RC	Fluid	11.0g, RDX	6 spf / 60°	3-1/2"			0.25 [0.64]	11.40 [28.96]	
		EC2-23A1122-RC		11.0g, HMX					0.31 [0.79]	11.35 [28.83]	
		EC2-23A1123-RC		11.0g, HNS					0.23 [0.58]	8.70 [22.10]	
	2311 Connex SDP XLS	EC2-23A1121-RC-LS	Dry	10.5g, RDX	‡ 5 spf / 60°				0.25 [0.64]	11.40 [28.96]	
		EC2-23A1122-RC-LS		10.5g, HMX					0.31 [0.79]	11.35 [28.83]	
		EC2-23A1121-RC-LS	Fluid	10.5g, RDX	6 spf / 60°				0.25 [0.64]	11.40 [28.96]	
		EC2-23A1122-RC-LS		10.5g, HMX			0.31 [0.79]	11.35 [28.83]			
2-1/2"	2511 Connex SDP	EC2-25A1121-RC	Fluid	11.5g, RDX	6 spf / 60°	3-1/2"			0.28 [0.71]	11.50 [29.21]	
		EC2-25A1122-RC		11.5g, HMX					0.29 [0.74]	12.00 [30.48]	
2-3/4"	2715 Connex SDP	EC2-27A1521-RC	In Fluid or Dry	15.0g, RDX	6 spf / 60°	4-1/2"			0.30 [0.76]	11.70 [29.72]	
		EC2-27A1522-RC		15.0g, HMX					0.31 [0.79]	12.18 [30.94]	
2-7/8"	2715 Connex SDP	EC2-27A1521-RC	In Fluid or Dry	15.0g, RDX	6 spf / 60°	4-1/2"			0.30 [0.76]	11.70 [29.72]	
		EC2-27A1522-RC		15.0g, HMX					0.31 [0.79]	12.18 [30.94]	
		EC2-27A1523-RC		15.0g, HNS					0.25 [0.64]	9.90 [25.15]	
	2818 Connex SDP	EC2-28A1821-RC	Fluid	18.0g, RDX					0.42 [1.07]	13.00 [33.02]	
		EC2-28A1822-RC		18.0g, HMX					0.40 [1.02]	14.02 [35.61]	
		EC2-28A1823-RC		18.0g, HNS					0.33 [0.84]	10.55 [26.80]	
3-1/8"	3319 Connex RX	EC2-33A1991-RX	‡ Fluid or Dry	19.0g, RDX	6 spf / 60°	4-1/2"			0.32 [0.81]	11.30 [28.70]	
		EC2-33A1992-RX		19.0g, HMX					0.32 [0.81]	11.60 [29.46]	
	3323 Connex SDP	EC2-33A2321-RC	Fluid	22.7g, RDX					0.40 [1.02]	15.60 [39.62]	
		EC2-33A2322-RC		22.7g, HMX					0.46 [1.17]	15.31 [38.89]	
		EC2-33A2323-RC		22.7g, HNS					0.36 [0.91]	11.85 [30.10]	

‡ For 2-3/8" in dry gas, maximum shot density is 5 spf and limited to low-swell (LS) charges only.

For 3-1/8" 19g in dry gas, maximum shot density is 5 spf or limited to one- (1) and two- (2) shot short guns only.

FLUID: Qualified for shooting in FLUID only with perforating systems qualified by GEODynamics.

IN FLUID or DRY: Qualified for shooting in FLUID or DRY GAS with perforating systems qualified by GEODynamics.

Performance in concrete represents API RP43 or API RP19B Section 1 testing results with the shot density/phasing, casing OD, and casing grade specified.

^EHD performance in stressed berea represents API RP19B Section 2 testing results with casing flat metal plate equivalent to 0.500" 120KSI yield and penetration (TTP) in stressed berea rock.

SUPER DEEP PENETRATING (cont.)

Carrier O.D.	Shaped Charge	Part Number	Perforating Condition	Explosive	Shot Density / Phasing	Casing O.D.	Performance in Concrete		Performance in Stressed Berea		
						Application	EHD (in)[cm]	TTP (in)[cm]	EHD ² (in)[cm]	TTP (in)[cm]	
3-3/8"	3319 Connex RX	EC2-33A1991-RX	In Fluid or Dry	19.0g, RDX	6 spf / 60°	5-1/2"			0.32 [0.81]	11.30 [28.70]	
		EC2-33A1992-RX		19.0g, HMX					0.32 [0.81]	11.60 [29.46]	
	3323 Connex SDP	EC2-33A2321-RC	In Fluid or Dry	22.7g, RDX		4-1/2"			0.40 [1.02]	15.60 [39.62]	
		EC2-33A2322-RC		22.7g, HMX					0.46 [1.17]	15.31 [38.89]	
	3325 Connex SDP	EC2-33A2323-RC	Fluid	22.7g, HNS		4-1/2"			0.36 [0.91]	11.85 [30.10]	
		EC2-33B2521-RC		25.0g, RDX					0.40 [1.02]	15.10 [38.35]	
		EC2-33B2522-RC		25.0g, HMX					0.48 [1.22]	15.45 [39.24]	
		EC2-33B2523-RC		25.0g, HNS					0.35 [0.89]	12.30 [31.24]	
4"	3323 Connex SDP	EC2-33A2322-RC	Fluid	22.7g, HMX	6 spf / 60°	5-1/2"			0.46 [1.17]	15.31 [38.89]	
	4039 Connex SDP	EC2-40A3921-RC		39.0g, RDX	4 spf / 60°				0.41 [1.04]	17.15 [43.56]	
EC2-40A3922-RC		39.0g, HMX						0.43 [1.09]	17.80 [45.21]		
EC2-40A3923-RC		39.0g, HNS						0.36 [0.91]	15.20 [38.61]		
4-1/2"	3323 Connex SDP	EC2-33A2321-RC	Fluid	22.7g, RDX	6 spf / 60°	5-1/2"			0.34 [0.86]	14.75 [37.47]	
		EC2-33A2322-RC		22.7g, HMX					0.46 [1.17]	15.31 [38.89]	
		EC2-33A2323-RC		22.7g, HNS					0.36 [0.91]	10.50 [26.67]	
	3323 Connex SDP	EC2-33A2321-RC		Fluid	22.7g, RDX	12 spf / 135°-45°	7.0"				
		EC2-33A2322-RC			22.7g, HMX					0.46 [1.17]	15.31 [38.89]
	4039 Connex SDP	EC2-40A3921-RC			39.0g, RDX	5 spf / 60°	7.0"			0.41 [1.04]	17.15 [43.56]
		EC2-40A3922-RC			39.0g, HMX					0.43 [1.09]	17.80 [45.21]
		EC2-40A3923-RC		39.0g, HNS					0.36 [0.91]	15.20 [38.61]	
4-5/8"	3323 Connex SDP	EC2-33A2321-RC	Fluid	22.7g, RDX	12 spf / 135°-45°	7.0"					
		EC2-33A2322-RC		22.7g, HMX					0.46 [1.17]	15.31 [38.89]	
	4039 Connex SDP	EC2-40A3921-RC		39.0g, RDX	5 spf / 60°	7.0"			0.41 [1.04]	17.15 [43.56]	
		EC2-40A3922-RC		39.0g, HMX					0.43 [1.09]	17.80 [45.21]	
7"	4039 Connex SDP	EC2-40A3923-RC	Fluid	39.0g, HNS	12 spf / 135°-45°	9-5/8"			0.36 [0.91]	15.20 [38.61]	
		EC2-40A3921-RC		39.0g, RDX					0.46 [1.17]	16.50 [41.91]	
		EC2-40A3922-RC		39.0g, HMX					0.42 [1.07]	17.50 [44.45]	

GOOD HOLE

Carrier O.D.	Shaped Charge	Part Number	Perforating Condition	Explosive	Shot Density / Phasing	Casing O.D.	Performance in Concrete		Performance in Stressed Berea	
						Application	EHD (in)[cm]	TTP (in)[cm]	EHD [^] (in)[cm]	TTP (in)[cm]
2-7/8"	2715 Connex XEH	EC2-27A1541-RC	In Fluid or Dry	15.0g, RDX	6 spf / 60°	4-1/2"			0.30 [0.76]	12.30 [31.24]
		EC2-27A1542-RC		15.0g, HMX					0.35 [0.89]	11.60 [29.46]
3-1/8"	3319 Connex XEH	EC2-33A1941-RC	‡ Fluid or Dry	19.0g, RDX	6 spf / 60°	4-1/2"			0.41 [1.04]	14.20 [36.07]
		EC2-33A1942-RC		19.0g, HMX					0.42 [1.07]	14.37 [36.50]
	3323 Connex XEH	EC2-33A2341-RC	Fluid	22.7g, RDX					0.43 [1.09]	15.60 [39.62]
		EC2-33A2342-RC		22.7g, HMX					0.43 [1.09]	15.89 [40.36]
3-3/8"	3319 Connex XEH	EC2-33A1941-RC	In Fluid or Dry	19.0g, RDX	6 spf / 60°	4-1/2"			0.41 [1.04]	14.20 [36.07]
		EC2-33A1942-RC		19.0g, HMX					0.42 [1.07]	14.37 [36.50]
	3323 Connex XEH	EC2-33A2341-RC	In Fluid or Dry	22.7g, RDX					0.43 [1.09]	15.60 [39.62]
		EC2-33A2342-RC		22.7g, HMX					0.43 [1.09]	15.89 [40.36]
	3325 Connex XEH	EC2-33B2541-RC	Fluid	25.0g, RDX						
		EC2-33B2542-RC		25.0g, HMX						
		EC2-33A2341-RC		22.7g, RDX					0.40 [1.02]	14.92 [37.90]
		EC2-33A2342-RC		22.7g, HMX					0.34 [0.86]	14.72 [37.39]
4-1/2"	3323 Connex XEH	EC2-33A2341-RC	Fluid	22.7g, RDX	6 spf / 60°	7.0"			0.43 [1.09]	15.89 [40.36]
		EC2-33A2342-RC		22.7g, HMX						

‡ For 3-1/8" 19g in dry gas, maximum shot density is 5 spf or limited to one- (1) and two- (2) shot short guns only.

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TUNNELS AND TIPS

Clean tunnels and fractured tips? Absolutely. What better place to initiate an acid matrix or fracture stimulation? Connex® charges reduce breakdown and treating pressures, improve treating rates, eliminate tortuosity, and minimize the risk of screen-outs.

WHAT UNDERBALANCE?

Unlike traditional underbalanced perforating, the effectiveness of Connex® systems is not dependent on rock properties, wellbore or formation pressures. Debris is expelled independently from every tunnel, even across the most heterogeneous intervals. Systems designed to enhance underbalance are no longer required, making wireline perforating an affordable and effective solution in most cases.

NO RISK... ALL REWARD

Connex® products deploy in standard hardware. Gun performance and wellbore integrity are unaffected. Penetration into stressed rock is equivalent to GEODynamics' industry-leading Razor® charges.

**If you're ready for next level performance
Specify Connex® on Your Next Well Program
INFO@PERF.COM**