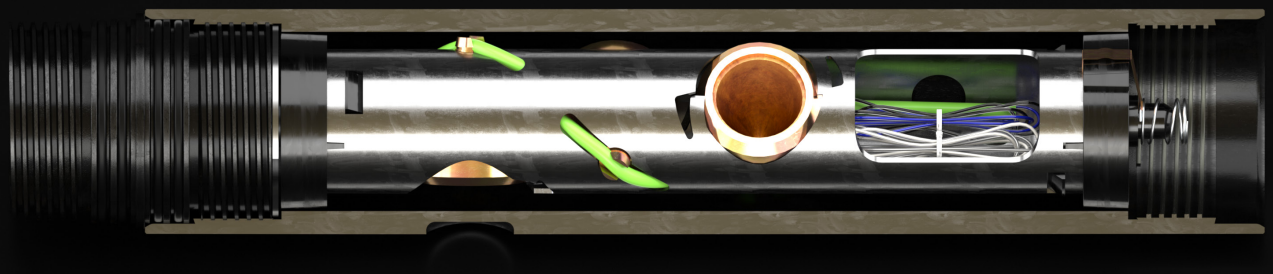
GEODynamics®



VaporGun™

The VaporGun™ advanced perforating system features a versatile, addressable switch ready, portless, and oriented solution that provides high levels of precision and reliability. VaporGun's open architecture design allows engineering teams to plan and complete multistage plug-and-perf operations more safely, precisely, and cost-effectively.

VaporGun can be used with any addressable switch on the market. VaporGun's gun-to-sub and gun-to-gun connections are wireless with zero-tension connectors and are designed with a redundant, integrated grounding system. Connection options include disposable, reusable, and oriented subs to accommodate all preferences of design, cost, and rebuild strategies.

VaporGun can accommodate a variety of market-leading charge designs, including GEODynamics charges. VaporGun delivers true entry hole performance with the highest levels of precision. GEODynamics can provide VaporGun fully loaded, or ready to load, and with or without an addressable switch.

FEATURES

- Portless gun system
- Disposable, reusable, and oriented subs
- Zero tension connections at each sub feed-through pin
- Integrated redundant grounding and charge tube retention
- Compliant with multiple electro-mechanical systems
- 3-1/8" and 3-3/8" carriers available as a turn-key system or individual component

APPLICATIONS

- Limited entry perforating design
- Unconventional reservoirs
- Conveyable on wireline, slickline, and tubing

BENEFITS

- Shorter gun strings
- Flexible utilization
- Faster loading process for service providers
- Easy troubleshooting
- Spiral shot configurations with multiple phasing options offer one (1) to 19 shots per carrier, compatible with FracIQ™ , Basix™, Razor®, Connex®, Refrax™, and other charge manufacturer technologies
- Planar shot configurations offer one (1) to six (6) shot clusters using HELLFire™ charge technology

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VaporGun™

GEODynamics®

Industry-leading shaped charge performance=

BETTER WELL PERFORMANCE

This performance is achieved by combining cutting edge designs, state of the art production processes, and rigorous quality control.

3-1/8" SPIRAL CHARGES

FRACIQ®

Product Name	Part Number	Perforating Condition	Explosive	API Performance				
				Shot Density and Phasing	API 19B Targeted Pipe*	Entrance Hole *(in)[cm]*	EHD Variation Decentralized	Rock Penetration API 19B-Sec. 2 *(in)[cm]*
FracIQ 25	EC2-33A1371	Fluid	13.0g, RDX	6 spf / 60°	4.5-5.5" OD	0.26 [0.66]	4.1%	5.0 [12.70]
FracIQ 30	EC2-33A1671		16.0g, RDX		4.5-5.5" OD	0.32 [0.81]	4.6 %	
	EC2-33A1672		16.0g, HMX			0.34 [0.86]	3.8 %	
FracIQ 35	EC2-33A2071		20.0g, RDX		4.5-5.5" OD	0.37 [0.94]	3.4 %	
	EC2-33A2072		20.0g, HMX			0.37 [0.94]	3.0 %	
FracIQ 40	EC2-33A2371		23.0g, RDX		4.5-5.5" OD	0.42 [1.07]	3.5 %	
	EC2-33A2372		23.0g, HMX			0.41 [1.04]	3.8 %	
FracIQ 45	EC2-33A2071-45		20.0g, RDX		4.5" OD	0.45 [1.14]	2.5%	
FracIQ 50	EC2-33A2371-50		23.0g, RDX		4.5-5.5" OD	0.50 [1.27]	1.5%	
	EC2-33A2372-RX		23.0g, HMX		5.5" OD	0.50 [1.27]	3.0%	
FracIQ 55	EC2-33A2371-55		23.0g, RDX		4.5" OD	0.55 [1.40]	3.8%	

**3-1/8" FracIQ charge performance is compatible in 4.5" 11.6-15.1# and 5.5" 17-23# P-110 casing.*

BASIX™ GOOD HOLE, BIG HOLE, DEEP PENETRATING

Product Name	Part Number	Perforating Condition	Explosive	Shot Density and Phasing	API Casing Size *(in)[cm]*	Entrance Hole *(in)[cm]*	Penetration	
							(in)[cm]	*(test)*
3319 Basix GH	EC2-33A1941	In Fluid or Dry	19.0g, RDX	6 spf / 60°	4.5 [11.43]	0.60 [1.52]	28.55 [72.52]	API RP 43
	EC2-33A2341	Fluid	22.7g, RDX			*	*	*
3323 Basix BH	EC2-33A2331	Fluid	22.7g, RDX		*	*	*	*
	EC2-33A2332		22.7g, HMX			*	*	*
3319 Basix XDP	EC2-33A1921	In Fluid or Dry	19.0g, RDX		4.5 [11.43]	0.51 [1.30]	42.07 [106.86]	API RP 43
3319 Basix DP	EC2-33A1951	In Fluid or Dry	19.0g, RDX			*	29.20 [74.17]	QC
3323 Basix XDP	EC2-33A2321	Fluid	22.7g, RDX		4.5 [11.43]	0.54 [1.37]	*	*
	EC2-33A2321-E		22.7g, RDX			0.42 [1.07]	46.01 [116.87]	API RP 43

** Test results pending.*

BASIX™ FRAC CONSTANT ENTRY HOLE AND PENETRATION

Product Name	Part Number	Perforating Condition	Explosive	Shot Density and Phasing	API 19B Targeted Pipe*	Entrance Hole *(in)[cm]*	EHD Variation Decentralized	Rock Penetration API 19B-Sec. 2 *(in)[cm]*
Basix Frac 30	EC2-33A1471-BF	Fluid	14.0g, RDX	6 spf / 60°	4.5" - 5.5" OD P-110	0.31 [0.79]	4.0 %	4.0 [10.16]
Basix Frac 35	EC2-33A1871-BF		18.0g, RDX			0.36 [0.91]	3.4 %	
Basix Frac 40	EC2-33A2371-BF		23.0g, RDX			0.40 [1.02]	6.6 %	
Basix Frac 45	EC2-33A2371-BF45		23.0g, RDX			0.45 [1.14]	5.9%	

CONNEX®

Product Name	Part Number	Perforating Condition	Explosive	Shot Density and Phasing	API Casing		API Heavy Wall^	Penetration Stressed Berea
					Size *(in)[cm]*	Entrance Hole *(in)[cm]*	Entrance Hole *(in)[cm]*	API 19B Sec. 2 *(in)[cm]*
3319 Connex XEH	EC2-33A1941-RC	In Fluid or Dry	19.0g, RDX	6 spf / 60°	4.5 [11.43]	*	*	*
	EC2-33A1942-RC		19.0g, HMX			0.52 [1.32]	0.42 [1.07]	14.37 [36.50]
3319 Connex RX	EC2-33A1991-RX	In Fluid or Dry	19.0g, RDX		4.5 [11.43]	*	*	*
	EC2-33A1992-RX		19.0g, HMX			0.40 [1.02]	0.32 [0.81]	11.60 [29.46]
3323 Connex	EC2-33A2321-RC	Fluid	22.7g, RDX		4.5 [11.43]	0.40 [1.02]	*	15.60 [39.62]
	EC2-33A2322-RC		22.7g, HMX			0.46 [1.17]	0.46 [1.17]	15.31 [38.89]
3323 Connex XEH	EC2-33A2341-RC	Fluid	22.7g, RDX		4.5 [11.43]	*	*	*
	EC2-33A2342-RC		22.7g, HMX			0.50 [1.27]	0.43 [1.09]	15.89 [40.36]

^ API Heavy wall casing is equivalent to 0.500" 120KSI yield.
** Test results pending.*

RAZOR® EXTREME DEEP PENETRATING

Product Name	Part Number	Perforating Condition	Explosive	Shot Density and Phasing	API Casing Size *(in)[cm]*	Entrance Hole *(in)[cm]*	Penetration	
							(in)[cm]	*(test)*
3319 Razor XDP	EC2-33A1922	In Fluid or Dry	19.0g, HMX	6 spf / 60°	4.5 [11.43]	0.43 [1.09]	14.60 [37.08]	API 19B Sec. 2
3323 Razor XDP	EC2-33A2322	Fluid	22.7g, HMX			0.49 [1.24]	41.10 [104.39]	API RP 43
	EC2-33A2322-E				4.5 [11.43]	0.42 [1.07]	39.02 [99.11]	API RP 43

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VaporGun™

REFRAX™

Product Name	Part Number	Perforating Condition	Explosive
3314 Refrax	EC2-33A1471-D	Fluid	14.0g, RDX
3316 Refrax	EC2-33A1671-D		16.0g, RDX
3320 Refrax	EC2-33A2071-D		20.0g, RDX
3316 Refrax	EC2-33A1671-D		16.0g, RDX
3323 Refrax	EC2-33A2371-D		23.0g, RDX

API Performance in Dual Casing				
Shot Density and Phasing	Inner Casing	Inner Casing EH *(in)[cm]*	Outer Casing	Outer Casing EH *(in)[cm]*
6 spf / 60°	Expanded 4.0" P110	0.33-0.33 [0.84-0.84]	5.5" P110	0.30-0.30 [0.76-0.76]
		0.37-0.38 [0.94-0.95]		0.35-0.35 [0.89-0.89]
		0.41-0.42 [1.04-1.07]		0.40-0.40 [1.02-1.02]
	4.5" P110	0.30-0.32 [0.76-0.81]	7.0" P110	0.39-0.41 [0.99-1.04]
		0.41-0.42 [1.04-1.07]		0.35-0.35 [0.89-0.89]

3-1/8" HELLFIRE™ CHARGES

HELLFIRE™ EXTERNAL SCALLOPS

Product Name	Part Number	Perforating Condition	Explosive
HELLFire 26	EC2-31K0671-26	Fluid	6g, RDX
HELLFire 28	EC2-31K0671-28		6g, RDX
HELLFire 33	EC2-31K0771-33		7g, RDX
HELLFire 36	EC2-31K0771-36		7g, RDX
HELLFire 42	EC2-31K0771-42		7g, RDX

IMPORTANT: HELLFire 31K charges are NOT interchangeable with 33K charges. EC2-33K series are for 3-3/8" HELLFire only.

API Performance				
Shot Density	API 19B Targeted Pipe	Entrance Hole *(in)[cm]*	EHD Variation	Rock Penetration API 19B-Sec. 2 *(in)[cm]*
1 to 6 shots per cluster	4.5" OD, P110	0.26 [0.66]	7.4 %	3.2 [8.13]
		0.28 [0.71]	5.5 %	
		0.33 [0.84]	2.9 %	
		0.36 [0.91]	1.6 %	
		0.42 [1.07]	3.8 %	

3-3/8" SPIRAL CHARGES

FRACIQ®

Product Name	Part Number	Perforating Condition	Explosive
FracIQ 25	EC2-33A1371	Fluid	13.0g, RDX

API Performance				
Shot Density and Phasing	API 19B Targeted Pipe*	Entrance Hole *(in)[cm]*	EHD Variation Decentralized	Rock Penetration API 19B-Sec. 2 *(in)[cm]*
6 spf / 60°	6.0" OD P110	0.26 [0.66]	2.3%	5.0 [12.70]

BASIX™ BIG HOLE AND GOOD HOLE

Product Name	Part Number	Perforating Condition	Explosive
3323 Basix BH	EC2-33A2331	Fluid	22.7g, RDX
3323 Basix GH	EC2-33A2341	In Fluid or Dry	22.7g, RDX
3325 Basix GH	EC2-33B2541	Fluid	25.0g, RDX

Shot Density and Phasing	API Casing Size *(in)[cm]*	Entrance Hole *(in)[cm]*	Penetration *(in)[cm]*	Penetration *(test)*
6 spf / 60°	7.0 [17.78]	0.74 [1.88]	7.13 [18.11]	API RP 43
	4-1/2 [11.43]	0.52 [1.32]	33.58 [85.29]	API RP 43
		0.57 [1.45]	25.91 [65.81]	

BASIX™ DEEP PENETRATING

Product Name	Part Number	Perforating Condition	Explosive
3323 Basix DP	EC2-33A2351	In Fluid or Dry	22.7g, RDX
3323 Basix XDP	EC2-33A2321-E	In Fluid or Dry	22.7g, RDX
3325 Basix XDP	EC2-33B2521-E	Fluid	25.0g, RDX
3325 Basix XDP	EC2-33B2521	Fluid	25.0g, RDX

Shot Density and Phasing	API Casing Size *(in)[cm]*	Entrance Hole *(in)[cm]*	Penetration *(in)[cm]*	Penetration *(test)*
6 spf / 60°	4-1/2 [11.43]	0.47 [1.19]	32.10 [81.53]	QC
		0.45 [1.14]	46.32 [117.65]	API RP 43
		0.45 [1.14]	50.08 [127.20]	API RP 43
		0.45 [1.14]	44.58 [113.23]	API RP 43

CONNEX®

Product Name	Part Number	Perforating Condition	Explosive
3319 Connex RX	EC2-33A1992-RX	In Fluid or Dry	19.0g, HMX
3323 Connex	EC2-33A2322-RC		22.7g, HMX
3323 Connex XEH	EC2-33A2342-RC		22.7g, HMX
3325 Connex	EC2-33B2522-RC	Fluid	25.0g, HMX
3325 Connex XEH	EC2-33B2542-RC		25.0g, HMX

Shot Density and Phasing	API Casing		API Heavy Wall^	Penetration Stressed Berea
	Size *(in)[cm]*	Entrance Hole *(in)[cm]*	Entrance Hole *(in)[cm]*	API 19B Sec. 2 *(in)[cm]*
6 spf / 60°	5-1/2 [13.97]	0.42 [1.07]	0.32 [0.81]	11.60 [29.46]
	4-1/2 [11.43]	0.47 [1.19]	0.46 [1.17]	15.31 [38.89]
		0.50 [1.27]	0.43 [1.09]	15.89 [40.36]
	4-1/2 [11.43]	0.53 [1.35]	0.48 [1.22]	15.45 [39.24]
		0.54 [1.37]	0.40 [1.02]	14.92 [37.90]

RAZOR® EXTREME DEEP PENETRATING

Product Name	Part Number	Perforating Condition	Explosive
3323 Razor XDP	EC2-33A2322	In Fluid or Dry	22.7g, HMX
3325 Razor XDP	EC2-33B2522	Fluid	25.0g, HMX

Shot Density and Phasing	API Casing Size *(in)[cm]*	Entrance Hole *(in)[cm]*	Penetration *(in)[cm]*	Penetration *(test)*
6 spf / 60°	4-1/2 [11.43]	0.45 [1.14]	46.32 [117.65]	API RP 43
	4-1/2 [11.43]	0.53 [1.35]	47.30 [120.14]	API RP 19B

3-3/8" HELLFIRE™ CHARGES

HELLFIRE™ EXTERNAL SCALLOPS

Product Name	Part Number	Perforating Condition	Explosive
HELLFire 25	EC2-33K0671-25	Fluid	6.0g, RDX
HELLFire 30	EC2-33K0771-30		7.0g, RDX
HELLFire 33	EC2-33K0771-33		7.0g, RDX
HELLFire 34	EC2-33K0771-34		7.0g, RDX

API Performance				
Shot Density	API 19B Targeted Pipe	Entrance Hole *(in)[cm]*	EHD Variation	Rock Penetration API 19B-Sec. 2 *(in)[cm]*
1 to 6 shots per cluster	5.5" OD, P-110	0.25 [0.64]	3.90%	3.5 [8.89]
		0.30 [0.76]	5.50%	
		0.33 [0.84]	3.60%	
		0.34 [0.86]	5.80%	

IMPORTANT: HELLFire 33K charges are NOT interchangeable with 31K charges. EC2-31K series are for 3-1/8" HELLFire only.
GEODynamics charges are available in RDX, HMX, and HNS. Please contact your sales representative for more information.

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