



CONSISTENT HOLE SIZES TO EQUALIZE PERFORATION FRICTION AND MINIMIZE THE EFFECTS OF TORTUOSITY

HERO®PerFRAC is the latest generation HERO® charge specifically designed to improve the efficiency of fracturing operations in today’s unconventional reservoirs. HERO®PerFRAC charges produce consistent entry hole sizes, regardless of gun position, to allow fracture initiation to occur at the face of the borehole. Utilizing HERO® super deep penetrating technology enables fracture initiation along the perforation tunnel at intersecting natural fractures. HERO®PerFRAC charges have been tested to verify that entry hole size performance is not affected by hydrostatic pressure, and penetration performance has been verified in stressed natural rock, including shale.

Want to improve the efficiency of your fracturing operations? Specify HERO®PerFRAC!

Advantages:

- Minimizes effects of tortuosity
- Maximizes cluster efficiency and increases SRV (Stimulated Reservoir Volume)
- Results in even distribution of fracture treatment and proppant placement
- Aides in reduction of treating pressures, reducing costs associated with hydraulic fracturing operations
- No special hardware required - uses industry standard hardware

Gun OD (in.)	Avg. Hole Size (in.)	Hole Size Variation (std dev)	*Stressed Berea Penetration (in.)	*Stressed Shale Penetration (in.)	Charge Part Number (Exp. Wt.)	Shot Density / Phasing	Casing
2.750	0.30	5.1%	8.63	5.63	PFC-2716-330 (16g)	6spf / 60°	4.50-in. 13.5# P-110
2.750	0.34	4.0%	10.44	6.87	PFC-2717-334 (16.8g)	6spf / 60°	4.50-in. 13.5# P-110
2.750	0.42	6.6%	6.75	5.13	PFC-2717-342 (16.8g)	6spf / 60°	4.50-in. 13.5# P-110
3.125	0.30	3.2%	6.88	5.00	PFC-3116-330 (16g)	6spf / 60°	5.50-in. 23# P-110
3.125	0.36	3.2%	9.63	6.50	PFC-3121-336 (21.5g)	6spf / 60°	5.50-in. 23# P-110
3.125	0.43	3.6%	7.50	4.88	PFC-3121-342 (21.5g)	6spf / 60°	5.50-in. 23# P-110
3.125	0.46	4.7%	7.97	5.57	PFC-3121-346 (21.5g)	6spf / 60°	5.50-in. 20# P-110
3.375	0.35	5.1%	9.63	6.50	PFC-3121-336 (21.5g)	6spf / 60°	5.50-in. 23# P-110
3.375	0.42	4.5%	7.50	4.88	PFC-3121-342 (21.5g)	6spf / 60°	5.50-in. 23# P-110
3.375	0.46	3.6%	7.97	5.57	PFC-3121-346 (21.5g)	6spf / 60°	5.50-in. 23# P-110

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*9500 psi overburden

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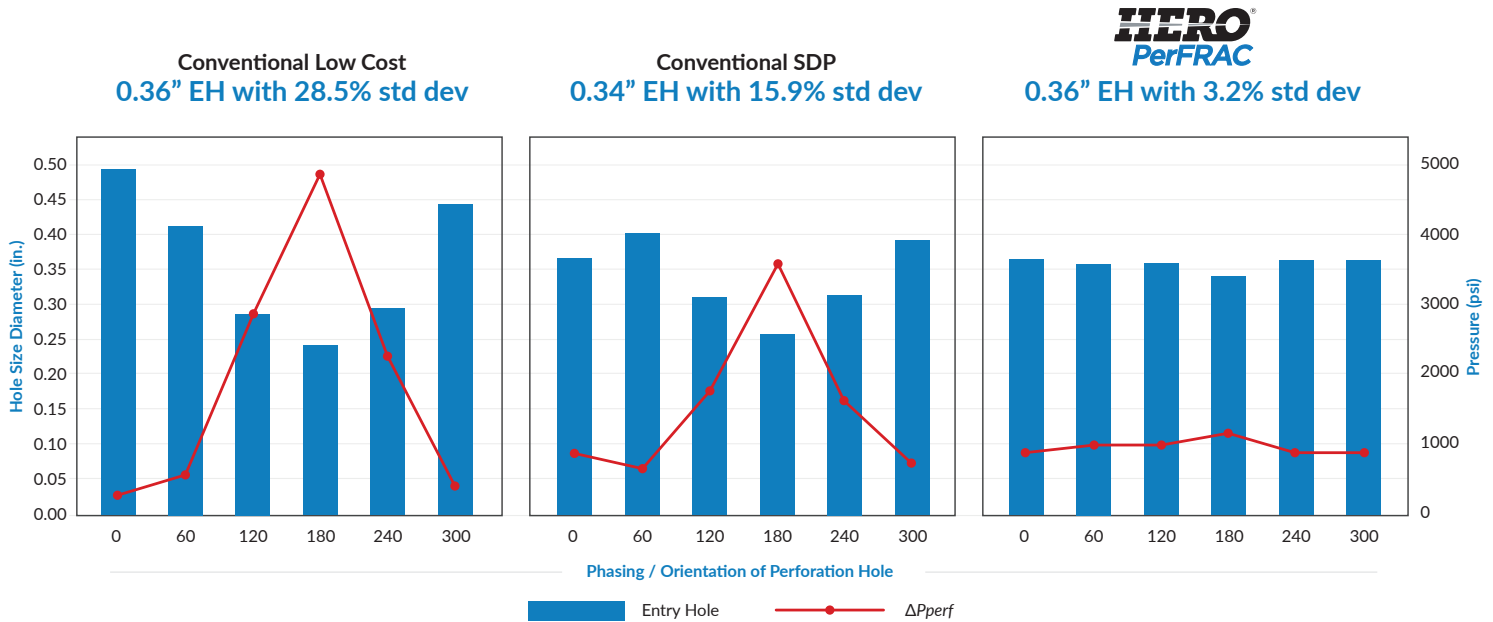


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Equalize ΔP_{perf} to increase cluster efficiency!

The charts and table below show how HERO® PerFRAC can equalize ΔP_{perf} in your frac design over conventional charges. These test results are from 3.125 in. 6spf 60° gun systems shot inside 5.50 in. 23# P-110 casing. The charts were generated using the following equation where $\rho = 8.33$ ppg, $Q = 2$ BPM/perf, D = average hole size of each phasing, and $C = 0.7$.

$$\Delta P_{perf} = \frac{.237\rho Q^2}{D^4 C^2}$$



	Conventional Low Cost	Conventional SDP	HERO PerFRAC
Average Hole Size (in.)	0.36	0.34	0.36
Minimum Hole Size (in.)	0.24	0.26	0.34
Maximum Hole Size (in.)	0.49	0.40	0.37

We have a large database of hole size test data in a wide variety of gun systems, charges, and tubulars, which allows us to provide you with test results that match your actual well scenario. Contact us with your limited entry design parameters and we can provide you test results to help you evaluate and select the best charge for your design. For more information, contact your local Owen representative, email us at owen.info@corelab.com, or call us at one of the numbers below.

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