



OWEN OIL TOOLS

HERO®-PerFRAC Charges



Expendable Scalloped Perforating Systems

O.D. (mm)	PHASING		CHARGE P/N	EXP. WEIGHT (g)	CASING			ENTRY HOLE			PEN (in)	ENTRY HOLE (mm)	CHARGE CODE	
	60°	90°			O.D. (mm)	WEIGHT (kg/m)	GRADE	AVERAGE (in)	MAX (in)	MIN (in)				
73	20D	13D	PFC-2717-334	16.8	114.3	17.3	L-80	0.36	0.34	0.37	34.2	9.1	75	
79	13D / 16.5F / 20F	13D	PFC-3121-336	21.5	114.3	17.3	L-80	0.42	0.40	0.45	31.1	10.7	86	
				21.5	114.3	20.1	P-110	0.37	0.36	0.38	31.1	9.4	86	
			PFC-3121-342	21.5	139.7	34.3	P-110	0.36	0.34	0.37	31.1	9.1	86	
				21.5	114.3	17.3	P-110	0.41	0.40	0.42	19.6	10.4	86	
				21.5	114.3	20.1	P-110	0.41	0.40	0.43	19.6	10.4	86	
				21.5	139.7	29.8	P-110	0.42	0.40	0.43	19.6	10.7	86	
				21.5	139.7	34.3	P-110	0.43	0.41	0.43	19.6	10.9	86	
				PFC-3121-346	21.5	114.3	17.3	P-110	0.46	0.44	0.48	22.8	11.7	86
					21.5	114.3	20.1	P-110	0.47	0.44	0.49	22.8	11.9	86
					21.5	139.7	29.8	P-110	0.46	0.43	0.48	22.8	11.7	86
21.5	139.7	34.3	P-110		0.45	0.43	0.48	22.8	11.4	86				
86	13D / 16.5D / 20F	13D	PFC-3121-336	21.5	139.7	34.3	P-110	0.36	0.33	0.40	32.3	9.1	8	
			PFC-3121-342	21.5	139.7	29.8	P-110	0.42	0.40	0.44	19.9	10.7	8	
			PFC-3121-346	21.5	139.7	29.8	P-110	0.46	0.43	0.49	23.5	11.7	8	
				21.5	139.7	34.3	P-110	0.46	0.44	0.48	23.5	11.7	8	

Charges listed are RDX, temp rating 330°F / 165°C for 1 hour. HMX versions are available, temp rating 400°F / 200°C for 1 hour.

Shaped charges may be available with RDX, HMX and HNS explosive, contact your Owen representative for information.

Hero PerFRAC Charges feature our Patented HWM (High Wolfram Molybdenum) Liner Technology. US Patents 6,354,219 & 6,655,291

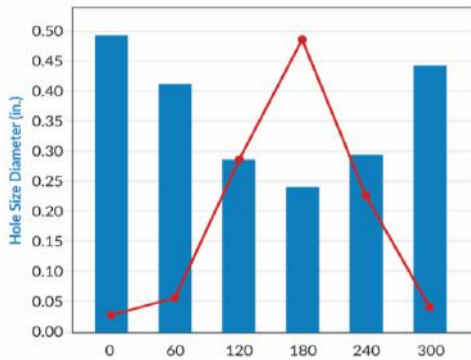
Equalize ΔP_{perf} to increase cluster efficiency!

The charts and table show HERO®PerFRAC can equalize ΔP_{perf} (pressure drop into each perforation). Significantly improving your frac design over conventional charges. Test results shown with 79 mm 20 SPM 60° gun systems. Charts generated with equation below where ρ = 8.33 ppg, Q = 2 BPM/perf, D = average hole size of each phasing, and C = 0.7.

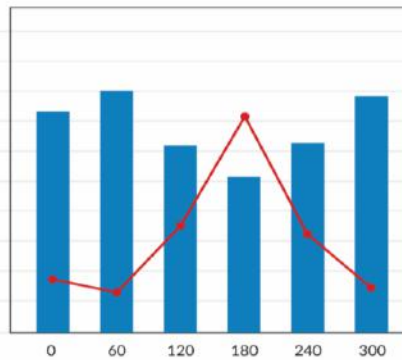
$$\Delta P_{perf} = \frac{.237\rho Q^2}{D^4 C^2}$$

	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

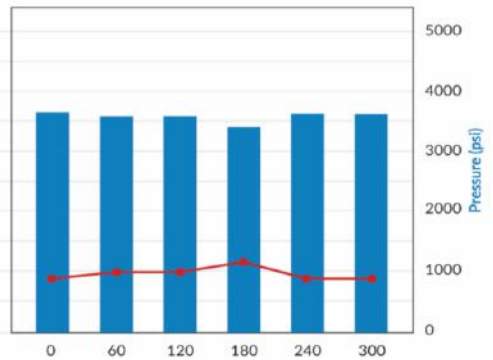
Conventional Low Cost
0.36" EH with 28.5% std dev



Conventional SDP
0.34" EH with 15.9% std dev



HERO PerFRAC
0.36" EH with 3.2% std dev



Phasing / Orientation of Perforation Hole

Entry Hole ΔP_{perf}

Red Deer (403) 340-1017

Grande Prairie (780) 539-0506

Calgary (403) 571-2400

Estevan (306) 636-6936

Red Deer toll free 1-888-345-1017

Lloydminster (780) 871-0670



OWEN OIL TOOLS

HERO®-HR Hard Rock Charges



Expendable Scalloped Perforating Systems

O.D. (mm)	CHARGE TYPE	SHOT DENSITY (SPM) DRY OR FLUID	PHASING	CHARGE P/N	EXP. WEIGHT (g)	CASING O.D. (mm)	ENTRY HOLE (in)	PEN. (in)	PEN. NORM. AT 5000psi (in)	ENTRY HOLE (mm)	DATA SOURCE	CHARGE CODE
52	SDP	13D/20D	60°	SDP-2107-410	6.5	73.0	0.26	25.20	25.90	6.6	RP-19B	37
73	SDP	13D/20D	60°	SDP-2715-310	15	114.3	0.32	43.07	43.07	8.1	EPA	75
79	SDP	13D/16.5F/20F	90°/60°/60°	SDP-3121-310	21	114.3	0.39	44.40	46.40	9.9	RP-19B‡	86
86	SDP	13D/16.5D/20D	90°/60°/60°	SDP-3121-310	21	114.3	0.42	45.20	49.10	10.7	RP-19B‡	8
	SDP	13D/16.5D/20F	90°/60°/60°	SDP-3325-310	25	114.3	0.41	56.10	59.40	10.4	RP-19B‡	8
101	SDP	14D/16.5D/20D	60°	SDP-3121-310	21	139.7	0.51	30.50	30.50	13.0	EPA	8
	SDP	14D/16.5D/20D	60°	SDP-3325-310	25	139.7	0.37	43.27	43.27	9.4	EPA	8
	SDP	14F/16.5F	90°/60°	SDP-4539-310	39	139.7	0.45	65.10	69.10	11.4	RP-19B‡	31
114	SDP	39F	135°/45°	SDP-3121-310	21	177.8	0.37	40.50	42.00	9.4	RP-19B	1
	SDP	14D/16.5F	60°	SDP-4539-310	39	177.8	0.40	69.30	72.90	10.2	RP-19B‡	31
127	SDP	14D/16.5F	60°	SDP-4539-310	39	177.8	0.42	68.75	72.30	10.7	EPA	31

RDX charges listed (-3XX part number) temp rating 330°F / 165°C for 1 hour. HMX charges (-4XX part number) temp rating 400°F / 200°C for 1 hour.

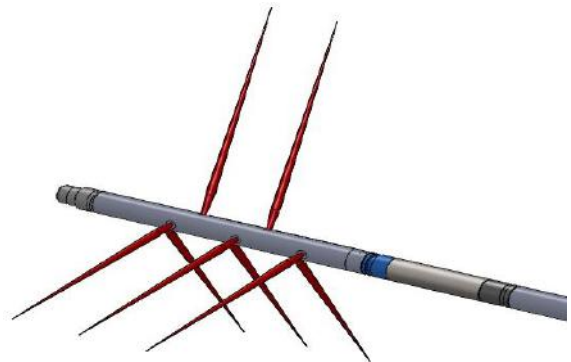
‡[HMX data used], + HMX Charge

Shaped charges may be available with RDX, HMX and HNS explosive, contact your Owen representative for information.

Hero-HR Hard Rock Charges feature our Patented HWM (High Wolfram Molybdenum) Liner Technology. US Patents 6,354,219 & 6,655,291



**Canada's only
Manufacturer of
"Perforating Systems"**



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Grande Prairie (780) 539-0506

Calgary (403) 571-2400
Estevan (306) 636-6936

Red Deer toll free 1-888-345-1017
Lloydminster (780) 871-0670



OWEN OIL TOOLS

Canadian Charge Performance Summary

Expendable Scalloped Perforating Systems

O.D. (mm)	CHARGE TYPE	CHARGE GROUP	SHOT DENSITY (SPM) DRY OR FLUID	PHASING	CHARGE P/N	EXP. WEIGHT (g)	CASING O.D. (mm)	ENTRY HOLE (in)	PEN. (in)	PEN. NORM. TO 5000 psi (in)	ENTRY HOLE (mm)	DATA SOURCE	CHARGE CODE
73	BH	CONVENTIONAL	13D/20D	60°	TAG-2750-401BH	14.5	114.3	0.60	5.70	6.21	15.2	RP-43	75
	SDP	SUPER HERO	13D/20D	60°	SDP-2750-311NT4	15	114.3	0.40	40.50	42.96	10.2	RP-43	75
	SDP	HERO-HR	13D/20D	60°	SDP-2715-310	15	114.3	0.32	43.07	43.07	8.1	EPA	75
79	DP	CONVENTIONAL	13D/16.5F/20F	90°/60°/60°	TAG-3375-311L	19	114.3	0.44	21.60	22.26	11.2	RP-43	86
	SGH	HERO	13D/16.5F/20F	90°/60°/60°	SGH-3119-330	19	114.3	0.50	40.16	42.13	12.7	RP-43	86
	BH	CONVENTIONAL	13D/16.5F/20F	90°/60°/60°	TAG-3375-301	20	114.3	0.70	6.18	6.35	17.8	RP-43	86
	SDP	SUPER HERO	13D/16.5F/20F	90°/60°/60°	SDP-3125-311NT4	21	114.3	0.35	34.24	39.50	8.9	RP-19B‡	86
	SDP	HERO-HR	13D/16.5F/20F	90°/60°/60°	SDP-3121-310	21	114.3	0.39	44.40	46.40	9.9	RP-19B‡	86
	GH	CONVENTIONAL	13D/16.5F/20F	90°/60°/60°	TAG-3375-311	21.5	114.3	0.52	24.90	25.12	13.2	RP-43	86
	SDP	HERO	13D/16.5F/20F	90°/60°/60°	SDP-3375-311NT	23	114.3	0.42	35.60	36.02	10.7	RP-43	86
86	DP	CONVENTIONAL	13D/16.5D/20F	90°/60°/60°	TAG-3375-311L	19	114.3	0.45	22.57	23.57	11.4	RP-43	8
	SGH	HERO	13D/16.5D/20D	90°/60°/60°	SGH-3119-330	19	114.3	0.55	36.35	36.35	14.0	EPA	8
	BH	CONVENTIONAL	13D/16.5D/20F	90°/60°/60°	TAG-3375-301	20	127.0	0.73	6.07	6.78	18.5	RP-43	8
	SDP	SUPER HERO	13D/16.5D/20D	90°/60°/60°	SDP-3125-311NT4	21	114.3	0.37	39.30	43.55	9.4	RP-19B‡	8
	SDP	HERO-HR	13D/16.5D/20D	90°/60°/60°	SDP-3121-310	21	114.3	0.42	45.20	49.10	10.7	RP-19B‡	8
	GH	CONVENTIONAL	13D/16.5D/20F	90°/60°/60°	TAG-3375-311	21.5	114.3	0.52	28.20	28.61	13.2	RP-43	8
	SDP	HERO	13D/16.5D/20D	90°/60°/60°	SDP-3375-311NT	23	114.3	0.43	33.84	37.24	10.9	RP-19B	8
	SDP	HERO-HR	13D/16.5D/20F	90°/60°/60°	SDP-3325-310	25	114.3	0.41	56.10	59.40	10.4	RP-19B‡	8
	SDP	HERO	13D/16.5D/20F	90°/60°/60°	SDP-3375-311NT3	25	114.3	0.48	47.90	51.82	12.2	RP-19B‡	8
	SDP	SUPER HERO	13D/16.5D/20F	90°/60°/60°	SDP-3375-311NT4	25	114.3	0.42	51.97	55.12	10.7	RP-43	8
	GH	CONVENTIONAL	13D/16.5D/20F	90°/60°/60°	TAG-3375-331	25	114.3	0.55	36.90	38.78	14.0	RP-19B	8
101	DP	CONVENTIONAL	14D/16.5D/20D	60°	TAG-3375-311L	19	139.7	0.44	21.32	21.79	11.2	RP-43	8
	SGH	HERO	14D/16.5D/20D	60°	SGH-3119-330	19	139.7	0.52	31.04	31.04	13.2	EPA	8
	BH	CONVENTIONAL	14D/16.5D/20D	60°	TAG-3375-301	20	139.7	0.74	6.98	6.98	18.8	EPA	8
	SDP	HERO-HR	14D/16.5D/20D	60°	SDP-3121-310	21	139.7	0.51	30.50	30.50	13.0	EPA	8
	GH	CONVENTIONAL	14D/16.5D/20D	60°	TAG-3375-311	21.5	139.7	0.51	26.00	26.49	13.0	RP-43	8
	SDP	HERO	14D/16.5D/20D	60°	SDP-3375-311NT	23	139.7	0.48	38.40	39.22	12.2	RP-43	8
	SDP	HERO	14D/16.5D/20D	60°	SDP-3375-311NT3	25	139.7	0.44	41.93	41.93	11.2	QC‡	8
	SDP	SUPER HERO	14D/16.5D/20D	60°	SDP-3375-311NT4	25	139.7	0.41	52.40	56.87	10.4	RP-43	8
	SDP	HERO-HR	14D/16.5D/20D	60°	SDP-3325-310	25	139.7	0.37	43.27	43.27	9.4	EPA	8
	GH	CONVENTIONAL	14D/16.5D/20D	60°	TAG-3375-331	25	139.7	0.56	31.75	31.75	14.2	EPA	8
	SDP	HERO-HR	14F/16.5F	90°/60°	SDP-4539-310	39	139.7	0.45	65.10	69.10	11.4	RP-19B‡	31
	SDP	HERO	14F/16.5F	90°/60°	SDP-4500-311NT3	39	139.7	0.43	49.16	55.24	10.9	RP-19B‡	31
	DP	CONVENTIONAL	14F/16.5F	90°/60°	TAG-4500-311	39	139.7	0.58	40.18	42.36	14.7	RP-43	31
114	SDP	HERO-HR	39F	135°/45°	SDP-3121-310	21	177.8	0.37	40.50	42.00	9.4	RP-19B	1
	SDP	HERO-HR	14D/16.5F	60°	SDP-4539-310	39	177.8	0.40	69.30	72.90	10.2	RP-19B‡	31
	SDP	HERO	14D/16.5F	60°	SDP-4500-311NT3	39	177.8	0.40	62.73	66.18	10.2	RP-43‡	31
	DP	CONVENTIONAL	14D/16.5F	60°	TAG-4500-311	39	177.8	0.52	42.27	44.60	13.2	RP-43	31
127	DP	CONVENTIONAL	14D/16.5D/20D	60°	TAG-3375-311L*	19	177.8	0.45	19.12	19.36	11.4	RP-43	8
	SGH	HERO	14D/16.5D/20D	60°	SGH-3119-330	19	177.8	0.44	38.90	38.90	11.2	EPA	8
	BH	CONVENTIONAL	14D/16.5D/20D	60°	TAG-3375-301	20	177.8	0.75	6.70	6.70	19.1	QC	8
	GH	CONVENTIONAL	14D/16.5D/20D	60°	TAG-3375-311*	21.5	177.8	0.49	25.72	26.04	12.4	RP-43	8
	SDP	HERO	14D/16.5D/20D	60°	SDP-3375-311NT	23	177.8	0.46	42.35	42.85	11.7	RP-43	8
	SDP	HERO	14D/16.5D/20D	60°	SDP-3375-311NT3	25	177.8	0.46	41.28	41.28	11.7	QC‡	8
	SDP	SUPER HERO	14D/16.5D/20D	60°	SDP-3375-311NT4*	25	177.8	0.37	47.15	48.45	9.4	RP-43	8
	GH	CONVENTIONAL	14D/16.5D/20D	60°	TAG-3375-331	25	177.8	0.49	34.35	34.34	12.4	EPA	8
	BH	PHANTOM	26F	135° 45°	HSC-5000-305ZPF	30	177.8	1.05	8.03	8.03	26.7	QC	60
	DP	CONVENTIONAL	26F	135° 45°	TAG-5000-314	32	177.8	0.57	22.62	22.62	14.5	QC	60
	GH	CONVENTIONAL	26F	135° 45°	TAG-3375-311*	19	177.8	0.49	25.72	26.04	12.4	RP-43	1
	DP	CONVENTIONAL	26F	135° 45°	TAG-3375-311L*	19	177.8	0.46	19.03	19.26	11.7	RP-43	1
	SDP	HERO	26F	135° 45°	SDP-3375-311NT	21.5	177.8	0.45	40.07	40.56	11.4	RP-43	1
SDP	HERO-HR	14D/16.5F	60°	SDP-4539-310	39	177.8	0.42	68.75	72.30	10.7	EPA	31	
SDP	HERO	14D/16.5F	90°/60°	SDP-4500-311NT3*	39	177.8	0.42	62.73	66.34	10.7	RP-43‡	31	
SDP	CONVENTIONAL	14D/16.5F	90°/60°	TAG-4500-311*	39	177.8	0.57	43.13	43.13	14.5	EPA‡	31	

‡[2-3/4" data used to format 2-7/8" data] †[5-1/8" data used to format 5" data] ‡[HMX data used]

RDX charges listed (-3XX part number) temp rating 330°F / 165°C for 1 hour. HMX charges (-4XX part number) temp rating 400°F / 200°C for 1 hour.

Shaped charges may be available with RDX, HMX and HNS explosive, contact your Owen representative for information.

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OWEN OIL TOOLS

Canadian Charge Performance Summary

O.D. (mm)	CHARGE TYPE	CHARGE GROUP	SHOT DENSITY (SPM) DRY, FLUID	PHASING	CHARGE P/N	EXP. WEIGHT (g)	Casing O.D. (mm)	ENTRY HOLE (in)	PENETRATION (in)	PEN. NORM. AT 5000 psi (in)	ENTRY HOLE (mm)	DATA SOURCE	CHARGE CODE
UZI Squeeze Gun Systems													
86	DP	CIRC	118F	120°/10°	HSC-2500-301	3.0	114.3	0.22	5.03	5.03	5.6	EPA	3
101	DP	CIRC	118F	120°/10°	HSC-2500-302	6	139.7	0.24	5.67	5.67	6.1	EPA	3
127	DP	CIRC	118F	120°/10°	HSC-2500-302	6.0	177.8	0.20	7.20	7.20	5.1	EPA	3
Shallow Gas Slick Gun Systems													
79	GH	CONVENTIONAL	7/12D	60°/90°	HSC-3125-332WC	11.0	114.3	0.42	21.56	N/A	10.7	QC	77
Through Tubing Perforating													
Shogun Systems													
43	SDP	HERO	13F/20F	0°	STP-1687-401NTX	8.8	114.3	0.23	18.00	25.2	5.8	RP-19B	N/A
	SDP	HERO	13F/20F	60°/40°	STP-1687-401NTX	8.8	114.3	0.24	19.31	22.1	6.1	RP-19B	N/A
	BH	CONVENTIONAL	13F/20F	0°/60°/40°	STP-1687-401NB	7.4	139.7	0.48	10.54	10.5	12.2	EPA	N/A
	SDP	CONVENTIONAL	13F/20F	0°/60°/40°	STP-1687-401NT	8.8	127.0	0.24	16.40	17.7	6.1	RP-43	N/A
54	BH	CONVENTIONAL	13F/20F	0°/60°/40°	STP-2125-401NB	12.5	139.7	0.62	12.97	13.0	15.7	EPA	N/A
	SDP	HERO	13F/20F	60°/40°	STP-2125-401NTX	14.2	139.7	0.28	25.25	29.8	7.1	RP-19B	N/A
	SDP	CONVENTIONAL	13F/20F	0°/60°/40°	STP-2125-401NT	14.2	139.7	0.26	23.64	24.3	6.6	RP-43	N/A
64	SDP	HERO	13F	60°	STP-2500-401NTX	26.7	139.7	0.36	32.62	39.3	9.1	RP-19B	N/A
Retrieval Tubing Gun Systems													
40	BH	CONVENTIONAL	13D/20D	0°/60°/90°/180°	RTG-1687-301BH	3.3	73.0	0.37	2.70	3.6	9.4	RP-43	38
	SDP	HERO	13D/20D	0°	SDP-1687-402NT3	3.3	73.0	0.16	12.20	15.1	4.1	RP-19B	38
	SDP	HERO	13D/20D	60°/90°/180°	SDP-1687-402NT3	3.3	73.0	0.16	10.56	12.1	4.1	RP-19B	38
52	BH	CONVENTIONAL	13D/20D	0°/60°/90°/180°	RTG-2125-402F	6.4	73.0	0.42	3.03	3.7	10.7	RP-19B	37
	GH	CONVENTIONAL	13D/20D	0°/60°/90°/180°	RTG-2125-302GH	6.4	139.7	0.36	6.62	6.6	9.1	RP-43	37
	DP	CONVENTIONAL	13D/20D	0°/60°/90°/180°	RTG-2125-402LS	5.1	114.3	0.26	18.98	19.0	6.6	RP-43	37
	SDP	HERO-HR	13D/20D	60°	SDP-2107-410	6.5	73.0	0.26	25.20	25.9	6.6	RP-19B	37
	SDP	HERO	13D/20F	0°/60°/90°/180°	SDP-2125-402NT3	6.5	73.0	0.24	19.38	23.6	6.1	RP-19B	37
Plug and Abandonment Circulation Charges													
40	PAC	CIRC	13F	0°	PAC-1562-450	3.2	N/A	0.31	0.125 - 0.188§	N/A	7.9	QC	38
	PAC	CIRC	13F	0°	PAC-1562-451	3.2	N/A	0.39	0.250 - 0.375§	N/A	9.9	QC	38
	PAC	CIRC	13F	0°	PAC-1562-453	3.2	N/A	0.41	0.375 - 0.500§	N/A	10.4	QC	38
	PAC	CIRC	13F	0°	PAC-1562-455	3.2	N/A	0.40	0.500 - 0.625§	N/A	10.2	QC	38
	PAC	CIRC	13F	0°	PAC-1562-457	3.2	N/A	0.28	0.625 - 0.750§	N/A	7.1	QC	38
	PAC	CIRC	13F	0°	PAC-1562-459	3.2	N/A	0.19	0.750 - 0.875§	N/A	4.8	QC	38

§[Use the smallest charge that will do the job, contact your sales rep for more information]

RDX charges listed (-3XX part number) temp rating 330°F for 1 hour. HMX charges (-4XX part number) temp rating 400°F for 1 hour.

Shaped charges may be available with RDX, HMX and HNS explosive, contact your Owen representative for information.

Gun Length	Number of Charges Required					
	7 SPM	13 SPM	14 SPM	16.5 SPM	20 SPM	26 SPM
0.5	4	7	8	9	11	14
1.0	8	14	15	17	21	27
1.5	11	20	22	25	31	40
2.0	15	27	29	34	41	53
2.5	18	33	36	42	51	66
3.0	22	40	43	50	61	79
3.5	25	46	50	58	71	92
4.0	29	53	57	67	81	105
4.5	32	59	64	75	91	118
5.0	36	66	71	83	101	131
5.5	39	72	78	91	111	144
6.0	43	79	85	100	121	157
6.5	46	85	92	108	131	170
7.0	50	92	99	116	141	183



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