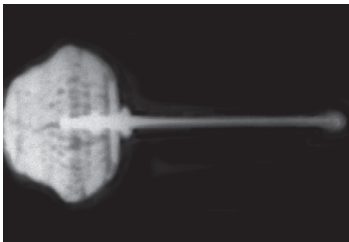


# Charge Performance Data



# DEEP-PENETRATING SHAPED CHARGES

Gun Size (in.)	Shot Density spf (spm)	Phasing	Halliburton Part No.	Charge Name	Penetration in. (mm)	Entrance Hole, in. (mm)	Casing Size, in. (mm)	Target Strength psi	Explosive Load gram	Case Material	Data Type
<b>CAPSULE GUNS</b>											
1 <sup>1</sup> / <sub>8</sub> in.	4 (13)	0	100005450	1 <sup>1</sup> / <sub>8</sub> -in. DYNA STAR, RDX	10.5 (266.7)	0.39 (9.9)	4 <sup>1</sup> / <sub>2</sub> in.	5,149	13.4	Steel	19B
1 <sup>1</sup> / <sub>8</sub> in.	6 (20)	0	101398891	1 <sup>1</sup> / <sub>8</sub> -in. MILLENNIUM Dyna Star, HMX	24.0 (609.6)	0.29 (7.4)	4 <sup>1</sup> / <sub>2</sub> in.	5,426	8	Steel	QC
1 <sup>1</sup> / <sub>8</sub> in.	8 (26)	0	101521848	080 MaxForce®, DEEP STAR, HMX	19.9 (505.5)	0.26 (6.6)	4 <sup>1</sup> / <sub>2</sub> in.	7,170	8	Steel	19B
2 <sup>1</sup> / <sub>8</sub> in.	8 (26)	0	101210198	2 <sup>1</sup> / <sub>8</sub> -in. MILLENNIUM DEEP STAR, HMX	30.7 (779.8)	0.35 (8.9)	5 <sup>1</sup> / <sub>2</sub> in.	5,189	15.9	Steel	RP43
2 <sup>1</sup> / <sub>8</sub> in.	8 (26)	0/45/90	101210198	2 <sup>1</sup> / <sub>8</sub> -in. MILLENNIUM DEEP STAR, HMX	20.6 (523.2)	0.30 (7.6)	5 <sup>1</sup> / <sub>2</sub> in.	6,740	15.9	Steel	19B
2 <sup>1</sup> / <sub>8</sub> in.	6 (20)	0	100005448	2 <sup>1</sup> / <sub>8</sub> -in. DYNA STAR, RDX	16.6 (421.9)	0.42 (10.7)	5 <sup>1</sup> / <sub>2</sub> in.	5,538	15.5	Steel	RP43
2 <sup>1</sup> / <sub>8</sub> in.	4 (13)	0	100005448	2 <sup>1</sup> / <sub>8</sub> -in. DYNA STAR, RDX	15.5 (393.7)	0.35 (8.9)	5 <sup>1</sup> / <sub>2</sub> in.	5,292	15.5	Steel	19B
<b>PORTED GUNS</b>											
4 in.	4 (13)	90	101288857	4" MILLENNIUM EXPRESS GSC RDX	27.18 (690.4)	0.51 (13.0)	5 <sup>1</sup> / <sub>2</sub> in.	5,600	19.5	Steel	QC
<b>SLICKWALL GUNS</b>											
3 <sup>3</sup> / <sub>8</sub> in.	6 (20)	60	101618994	3 <sup>3</sup> / <sub>8</sub> -in. MILLENNIUM EXPRESS IS SDP RDX	37.9 (962.6)	0.38 (9.7)	4 <sup>1</sup> / <sub>2</sub> in.	5,745	21	Steel	QC
3 <sup>3</sup> / <sub>8</sub> in.	6 (20)	60	101366678	3 <sup>3</sup> / <sub>8</sub> -in. MILLENNIUM IS HMX	38.3 (972.8)	0.40 (10.2)	4 <sup>1</sup> / <sub>2</sub> in.	6,200	21	Steel	QC
3 <sup>3</sup> / <sub>8</sub> in.	4 (13)	90	101204537	4-in. Basic MILLENNIUM EXPRESS RDX	16.7 (422.9)	0.50 (12.7)	5 <sup>1</sup> / <sub>2</sub> in.	6,277	19.5	Steel	QC
4 in.	4 (13)	90	101204537	4-in. Basic MILLENNIUM EXPRESS RDX	24.9 (633.5)	0.50 (12.7)	5 <sup>1</sup> / <sub>2</sub> in.	6,277	19.5	Steel	QC
3 <sup>3</sup> / <sub>8</sub> in.	4 (13)	90	101310802	4-in. Twisted Strip MILLENNIUM EXPRESS RDX W/ TWIST LOCK ½ RUBBER JACKET	16.7 (422.9)	0.50 (12.7)	5 <sup>1</sup> / <sub>2</sub> in.	6,277	19.5	Steel	QC
4 in.	4 (13)	90	101310802	4-in. Twisted Strip MILLENNIUM EXPRESS RDX W/ TWIST LOCK ½ RUBBER JACKET	24.9 (633.5)	0.50 (12.7)	5 <sup>1</sup> / <sub>2</sub> in.	6,277	19.5	Steel	QC
<b>SCALLOPED GUNS</b>											
1 <sup>1</sup> / <sub>8</sub> in.	4 (13)	0	100157028	1 <sup>1</sup> / <sub>8</sub> -in. MILLENNIUM, HMX, IS	11.3 (288.0)	0.21 (5.3)	4 <sup>1</sup> / <sub>2</sub> in.	5,967	3.4	Steel	RP43
1 <sup>1</sup> / <sub>8</sub> in.	6 (20)	60	100157028	1 <sup>1</sup> / <sub>8</sub> -in. MILLENNIUM, HMX, IS	8.3 (210.8)	0.23 (5.8)	2 <sup>1</sup> / <sub>8</sub> in.	6,949	3.4	Steel	19B
2 in.	6 (20)	60	101208224	2-in. MILLENNIUM, HMX, IS	18.3 (464.8)	0.22 (5.6)	2 <sup>1</sup> / <sub>8</sub> in.	6,019	6.8	Steel	19B
2 in.	6 (20)	60	101603801	070 MaxForce®, HMX, IS	20.3 (515.6)	0.24 (6.1)	2 <sup>1</sup> / <sub>8</sub> in.	5,697	7.0	Steel	19B
2 <sup>1</sup> / <sub>2</sub> in.	6 (20)	60	101206251	2 <sup>1</sup> / <sub>2</sub> -in. MILLENNIUM HMX SDP	26.5 (673.1)	0.32 (8.1)	3 <sup>1</sup> / <sub>2</sub> in.	5,854	11.0	Steel	RP43
2 <sup>1</sup> / <sub>2</sub> in.	6 (20)	60	101418095	2 <sup>1</sup> / <sub>2</sub> -in. MILLENNIUM II, HMX, IS	24.5 (622.3)	0.32 (8.1)	3 <sup>1</sup> / <sub>2</sub> in.	5,996	11.1	Steel	19B
2 <sup>3</sup> / <sub>8</sub> in.	6 (20)	60	101233817	2 <sup>3</sup> / <sub>8</sub> -in. MILLENNIUM, HMX	26.0 (660.4)	0.30 (7.6)	4 <sup>1</sup> / <sub>2</sub> in.	6,394	15.0	Steel	19B
2 <sup>3</sup> / <sub>8</sub> in.	6 (20)	60	101826652	175 MaxForce®, HMX	38.6 (980.4)	0.37 (9.4)	4 <sup>1</sup> / <sub>2</sub> in.	5,405	17.5	Steel	19B
2 <sup>3</sup> / <sub>8</sub> in. (HW)	6 (20)	60	101233817	2 <sup>3</sup> / <sub>8</sub> -in. MILLENNIUM, HMX	30.0 (762.0)	0.35 (8.9)	4 <sup>1</sup> / <sub>2</sub> in.	5,124	15.0	Steel	19B
2 <sup>3</sup> / <sub>8</sub> in.	6 (20)	60	101388406	2 <sup>3</sup> / <sub>8</sub> -in. MILLENNIUM, HMX	26.6 (676.4)	0.38 (9.7)	4 <sup>1</sup> / <sub>2</sub> in.	6,522	17.5	Steel	QC
3 <sup>1</sup> / <sub>8</sub> in.	6 (20)	60	101366678	3 <sup>1</sup> / <sub>8</sub> -in. MILLENNIUM, HMX, IS	33.9 (861.1)	0.34 (8.7)	4 <sup>1</sup> / <sub>2</sub> in.	5,598	21.0	Steel	19B
3 <sup>1</sup> / <sub>8</sub> in.	6 (20)	60	101618994	3 <sup>1</sup> / <sub>8</sub> -in. MILLENNIUM EXPRESS, RDX, IS	40.1 (1018.5)	0.38 (9.7)	4 <sup>1</sup> / <sub>2</sub> in.	5,460	21.0	Steel	QC
3 <sup>1</sup> / <sub>8</sub> in.	6 (20)	60	101233819	3 <sup>1</sup> / <sub>8</sub> -in. MILLENNIUM, HMX	37.5 (952.5)	0.45 (11.4)	4 <sup>1</sup> / <sub>2</sub> in.	5,754	25.0	Steel	19B
3 <sup>1</sup> / <sub>8</sub> in.	6 (20)	60	101293450	3 <sup>1</sup> / <sub>8</sub> -in. SUPER DP, RDX, LD	27.0 (685.8)	0.38 (9.7)	4 <sup>1</sup> / <sub>2</sub> in.	5,602	24.0	Zinc	QC
4 in.	4 (13)	90	101210636	4-in. MILLENNIUM, HMX	43.4 (1102.4)	0.38 (9.7)	5 <sup>1</sup> / <sub>2</sub> in.	6,365	39.0	Steel	19B
4 <sup>1</sup> / <sub>2</sub> in.	5 (16)	60	101210636	4-in. MILLENNIUM, HMX	39.6 (1005.8)	0.37 (9.4)	7 in.	6,775	39.0	Steel	19B
4 <sup>1</sup> / <sub>2</sub> in.	12 (39)	150/30	101210674	4 <sup>1</sup> / <sub>2</sub> -in. MILLENNIUM, HMX	26.8 (680.7)	0.38 (9.7)	7 in.	8,484	22.7	Steel	RP43
4 <sup>3</sup> / <sub>8</sub> in.	5 (16)	72	102054947	390 MaxForce®, HMX	61.6 (1564.6)	0.33 (8.4)	7 in.	5,513	39.0	Steel	19B
4 <sup>3</sup> / <sub>8</sub> in.	5 (16)	72	102624465	4 <sup>3</sup> / <sub>8</sub> -in. MILLENNIUM II, HMX	53.3 (1353.8)	0.43 (10.9)	7 in.	5,420	39.0	Steel	19B
4 <sup>3</sup> / <sub>8</sub> in.	5 (16)	60	101210636	4-in. MILLENNIUM, HMX	43.6 (1107.4)	0.35 (8.9)	7 in.	5,518	39.0	Steel	19B
4 <sup>3</sup> / <sub>8</sub> in.	6 (20)	60	100005322	4 <sup>3</sup> / <sub>8</sub> -in. DP, RDX	30.5 (773.7)	0.43 (10.9)	7 in.	5,325	32.0	Steel	RP43
4 <sup>3</sup> / <sub>8</sub> in.	12 (39)	150/30	101826652	175 MaxForce®, HMX	36.5 (927.1)	0.38 (9.6)	7 in.	5,937	17.5	Steel	19B
4 <sup>3</sup> / <sub>8</sub> in.	12 (39)	150/30	101210674	4 <sup>1</sup> / <sub>2</sub> -in. MILLENNIUM, HMX	24.4 (619.8)	0.38 (9.7)	7 in.	6,322	22.7	Steel	19B
4 <sup>3</sup> / <sub>8</sub> in.	12 (39)	150/30	100005340	4 <sup>3</sup> / <sub>8</sub> -in. DP OMNI, HMX, LD	18.4 (466.6)	0.30 (7.6)	7 in.	5,685	22.7	Zinc	RP43
4 <sup>3</sup> / <sub>8</sub> in.	12 (39)	150/30	101343830	4 <sup>3</sup> / <sub>8</sub> -in. DP OMNI, HNS	28.0 (711.2)	0.35 (8.9)	7 in.	5,020	21.5	Steel	QC
6 <sup>1</sup> / <sub>8</sub> in.	18 (59)	60/120	101972806	330 MaxForce®, HMX	37.4 (950.0)	0.40 (10.2)	9 <sup>1</sup> / <sub>2</sub> in.	5,241	33.0	Steel	19B
7 in.	12 (39)	135/45	102054947	390 MaxForce®, HMX	55.7 (1414.8)	0.32 (8.1)	9 <sup>1</sup> / <sub>2</sub> in.	5,760	39.0	Steel	19B
7 in.	12 (39)	135/45	101207997	7-in. MILLENNIUM, HMX	43.3 (1099.8)	0.36 (9.1)	9 <sup>1</sup> / <sub>2</sub> in.	7,006	39.0	Steel	RP43
7 in.	12 (39)	135/45	101702911	4 <sup>3</sup> / <sub>8</sub> -in. MILLENNIUM II, HMX	47.1 (1196.2)	0.43 (10.9)	9 <sup>1</sup> / <sub>2</sub> in.	5,982	39.0	Steel	19B
7 in.	12 (39)	135/45	101207997	7-in. MILLENNIUM, HMX	38.7 (983.0)	0.42 (10.7)	9 <sup>1</sup> / <sub>2</sub> in.	6,397	39.0	Steel	19B
<b>HNS HIGH TEMPERATURE SCALLOPED GUNS</b>											
2 in.	6 (20)	0	100157018	2-in. SIDEWINDER II, HNS, IS	11.8 (299.7)	0.23 (5.8)	4 <sup>1</sup> / <sub>2</sub> in.	5,960	6.9	Steel	QC
2 <sup>1</sup> / <sub>2</sub> in.	6 (20)	60	101318485	2 <sup>1</sup> / <sub>2</sub> -in. MILLENNIUM, HNS	27.5 (699.8)	0.30 (7.6)	4 <sup>1</sup> / <sub>2</sub> in.	5,694	15.1	Steel	QC
2 <sup>1</sup> / <sub>2</sub> in.	6 (20)	60	101388407	2 <sup>1</sup> / <sub>2</sub> -in. MILLENNIUM, HNS	22.8 (579.1)	0.28 (7.1)	4 <sup>1</sup> / <sub>2</sub> in.	6,859	18.5	Steel	19B
3 <sup>1</sup> / <sub>8</sub> in.	6 (20)	60	101365876	3 <sup>1</sup> / <sub>8</sub> -in. MILLENNIUM, HNS	22.1 (561.3)	0.31 (7.9)	4 <sup>1</sup> / <sub>2</sub> in.	6,578	25.0	Steel	19B
4 <sup>1</sup> / <sub>2</sub> in.	4 (13)	180	101287306	4-in. SUPER DP, HNS	30.2 (767.1)	0.29 (7.4)	7 <sup>1</sup> / <sub>2</sub> in.	6,349	39.0	Steel	19B
4 <sup>1</sup> / <sub>2</sub> in.	5 (16)	60	101287306	4-in. SUPER DP, HNS	31.2 (792.5)	0.33 (8.4)	7 in.	7,559	39.0	Steel	19B
4 <sup>1</sup> / <sub>2</sub> in.	6 (20)	60	101332806	4 <sup>1</sup> / <sub>2</sub> -in. DP, HNS	30.3 (769.6)	0.45 (11.4)	7 in.	5,814	32.0	Steel	QC
4 <sup>1</sup> / <sub>2</sub> in.	12 (39)	150/30	101343830	4 <sup>1</sup> / <sub>2</sub> -in. DP OMNI, HNS	28.0 (711.2)	0.35 (8.9)	7 in.	5,020	21.5	Steel	QC

# BIG HOLE SHAPED CHARGES

Gun Size (in.)	Shot Density spf (spm)	Phasing	Halliburton Part No.	Charge Name	Penetration in. (mm)	Entrance Hole in. (mm)	Casing Size in.	Target Strength psi	Explosive Load gram	Case Material	Data Type
<b>SCALLOPED GUNS</b>											
2½ in.	6 (20)	60	101206793	2½-in. BH, RDX	5.5 (139.7)	0.67 (17.0)	4½ in.	6,109	14.7	Steel	RP43
3½ in.	10 (33)	135/45	102327840	140 MaxForce® FLOW, HMX	4.4 (111.8)	0.66 (16.8)	5 in.	5,076	14	Steel	19B
3½ in.	10 (33)	135/45	101351605	3½-in. MIRAGE, HMX, LD	3.8 (96.5)	0.64 (16.3)	5 in.	6,100	14	Zinc	QC
3½ in.	6 (20)	60	102036926	220 MaxForce® FLOW, HMX	6.1 (154.9)	0.82 (20.8)	5 in.	5,000	22	Steel	QC
3½ in.	6 (20)	60	102185516	220 MaxForce® FLOW, HMX, ZINC	5.6 (142.2)	0.77 (19.6)	5 in.	5,000	22	Zinc	QC
3 in.	12 (39)	135/45	101351605	3½-in. MIRAGE, HMX, LD	4.1 (105.4)	0.63 (16.0)	5½ in.	6,100	14	Zinc	QC
3 in.	6 (20)	60	100005321	3½-in. BH, RDX	4.7 (118.4)	0.86 (21.8)	4½ in.	6,101	24	Steel	QC
3 in.	12 (39)	150/30	100008251	3½-in. BH, OMNI, RDX	5.3 (135.4)	0.62 (15.7)	5½ in.	7,802	14	Steel	RP43
3½ in.	12 (39)	135/45	101542642	3½-in. MIRAGE, HMX, LD	4.2 (106.7)	0.65 (16.5)	5½ in.	6,100	15	Zinc	QC
4 in.	12 (39)	150/30	100005319	4½-in. BH, RDX	6.4 (162.8)	0.74 (18.8)	7 in.	6,840	25	Steel	RP43
4 in.	12 (39)	150/30	100005326	4½-in. BH OMNI, RDX, LD	5.5 (140.0)	0.65 (16.5)	7 in.	7,346	22.7	Zinc	RP43
4 in.	12 (39)	150/30	100157006	4½-in. BH, HMX	7.0 (178.3)	0.75 (19.1)	7 in.	5,723	25	Steel	QC
4 in.	12 (39)	150/30	100005311	4½-in. SUPER BH, RDX	6.3 (160.0)	0.93 (23.6)	7 in.	6,982	28	Steel	RP43
4 in.	12 (39)	150/30	100156995	4½-in. SUPER HOLE, HMX	5.0 (127.3)	0.96 (24.4)	7 in.	5,016	28	Steel	RP43
4 in.	12 (39)	150/30	101233690	4½-in. SUPER HOLE, HMX, LD	5.3 (134.6)	0.85 (21.6)	7 in.	5,622	28	Zinc	RP43
4 in.	12 (39)	26/129	100156995	4½-in. SUPER HOLE, HMX	6.0 (152.4)	0.90 (22.8)	7 in.	6,009	28	Steel	19B
4 in.	18 (59)	135/45	100156990	4½-in. BH, RDX	6.2 (157.0)	0.73 (18.5)	7 in.	5,553	20	Steel	RP43
4 in.	15 (49)	135/45	102670829	300 MaxForce® FLOW, HMX	5.0 (127.0)	0.79 (20.1)	7½ in.	6,622	30	Zinc	19B
4 in. (HW)	14 (46)	135	101787632	4½-in. MIRAGE, HMX, LD	5.9 (149.9)	0.71 (18.0)	7 in.	6,506	21	Zinc	19B
5 in.	12 (39)	150/30	100005311	4½-in. SUPER HOLE, RDX	6.9 (175.3)	0.91 (23.1)	7 in.	5,192	28	Steel	RP43
5 in.	12 (39)	150/30	100005319	4½-in. BH, RDX	8.8 (223.5)	0.84 (21.3)	7 in.	6,508	25	Steel	QC
5 in.	12 (39)	150/30	100156995	4½-in. SUPER HOLE, HMX	6.0 (152.4)	1.00 (25.4)	7 in.	6,487	28	Steel	QC
5 in.	12 (39)	150/30	100005311	4½-in. SUPER HOLE, RDX	6.6 (168.9)	0.83 (21.1)	7½ in.	7,877	28	Steel	RP43
5 in.	12 (39)	135	101307494	5-in. MIRAGE, RDX, LD	6.0 (152.4)	0.90 (22.9)	7½ in.	6,551	32	Zinc	19B
5 in.	12 (39)	135	101307494	5-in. MIRAGE, RDX, LD	6.6 (167.6)	0.88 (22.4)	7½ in.	5,576	32	Zinc	19B
5 in.	21 (69)	120 Cluster	101292616	5-in. BH, RDX	5.6 (143.5)	0.74 (18.8)	7½ in.	6,246	21	Steel	QC
5½ in.	18 (59)	60/120	101688614	5½-in. MIRAGE, RDX, LD	6.5 (165.1)	0.94 (23.9)	8 in.	6,050	28	Zinc	QC
6½ in.	12/14 (39/46)	135/45/138	101304878	6½-in. MIRAGE, RDX, LD	5.6 (142.2)	1.07 (27.2)	8 in.	7,043	47	Zinc	19B
6½ in.	12/14 (39/46)	135/45/138	101304878	6½-in. MIRAGE, RDX, LD	6.8 (172.7)	0.91 (23.1)	9 in.	5,088	47	Zinc	19B
6½ in.	12/14 (39/46)	135/45/138	101304878	6½-in. MIRAGE, RDX, LD	6.8 (172.7)	0.90 (22.8)	9 in.	6,949	47	Zinc	19B
6½ in.	14 (46)	135	101304878	6½-in. MIRAGE, RDX, LD	6.6 (167.6)	0.72 (19.3)	10 in.	6,471	47	Zinc	19B
6¾ in.	18 (59)	60/120	102505344	390 MaxForce® FLOW UltraKleen, HMX	5.4 (137.2)	1.00 (25.4)	9 in.	6,350	39	Steel	19B
6¾ in.	18 (59)	60/120	102505344	390 MaxForce® FLOW UltraKleen, HMX	5.2 (133.8)	0.97 (24.6)	9 in.	6,683	39	Zinc	19B
6¾ in.	18 (59)	60/120	102505344	390 MaxForce® FLOW UltraKleen, HMX	5.8 (147.3)	0.77 (19.6)	10 in.	6,009	39	Steel	19B
6¾ in.	18 (59)	60/120	102428572	390 MaxForce® FLOW, HMX	5.5 (139.7)	1.02 (25.9)	9 in.	7,131	39	Steel	19B
6¾ in.	18 (59)	60/120	102528007	390 MaxForce® FLOW, HMX	6.1 (155.0)	0.82 (20.8)	9 in.	6,671	39	Zinc	19B
7 in.	12/14 (39/46)	138	101329124	6½-in. MIRAGE, HMX, LD	6.9 (175.3)	1.00 (25.4)	9 in.	5,740	47	Zinc	19B
7 in.	12/14 (39/46)	135/45/138	101304878	6½-in. MIRAGE, RDX, LD	6.1 (154.9)	1.07 (27.2)	9 in.	6,178	47	Zinc	19B
7 in.	12/14 (39/46)	135/45/138	101213474	7-in. SUPER HOLE, RDX	5.8 (147.3)	1.29 (32.8)	9 in.	5,975	56.5	Steel	19B
7 in.	12/14 (39/46)	135/45/138	101330987	7-in. SUPER HOLE, HMX	6.8 (172.7)	0.57 (14.5)	13½ in.	5,100	56.5	Steel	QC
7 in.	18 (59)	60/120	101711688	7-in. MIRAGE, HMX, LD	7.6 (194.1)	1.03 (26.2)	9 in.	5,950	39	Zinc	QC
7 in.	12/14 (39/46)	135/45/138	101228037	7-in. MIRAGE SUPER HOLE, RDX, LD	4.7 (119.4)	1.03 (26.2)	9 in.	5,746	39	Zinc	19B
7 in.	18 (59)	60/120	101711688	7-in. MIRAGE, HMX, LD	7.6 (194.1)	1.12 (28.4)	9 in.	5,950	39	Zinc	QC
7 in.	18 (59)	60/120	102599833	7-in. MIRAGE, RDX, LD	6.1 (155.0)	1.06 (26.9)	9 in.	5,950	39	Zinc	QC
7 in.	18 (59)	60/120	101833421	7-in. MIRAGE, HMX, LD	6.5 (165.1)	1.09 (27.7)	9 in.	6,446	40	Zinc	19B
7 in.	18 (59)	60/120	102351458	7-in. HMX BH	6.4 (162.6)	1.08 (27.4)	9 in.	6,474	39	Steel	19B

\* 19B is Registered API 19B Witnessed Test

## MAXFORCE®-FRAC SHAPED CHARGES

Gun Size (in.)	Shot Density, spf (spm)	Phasing	Halliburton Part No.	Charge Name	Penetration Cement QC, in. (mm)	Entrance Hole in. (mm)	Casing	EHD Shot Variance %	Explosive Load gram	Case Material	Data Type
2½ in.	6 (20)	60	102740045	150 MaxForce® FRAC, HMX, IS	23.7 (601.9)	0.36 (9.14)	4½-in. 13.5-lb P-110	2.4%	15.0	Steel	Barrel-QC
2½ in.	6 (20)	60	102745134	150 MaxForce® FRAC, RDX, IS	22.5 (571.5)	0.35 (8.89)	4½-in. 13.5-lb P-110	2.4%	15.0	Steel	Barrel-QC
3½ in.	6 (20)	60	102127122	210 MaxForce® FRAC, HMX, IS	17.8 (452.1)	0.49 (12.4)	4½-in. 11.7-lb L-80	5.8%	21.0	Steel	Barrel-QC
3½ in.	6 (20)	60	102045430	210 MaxForce® FRAC, RDX, IS	14.4 (365.8)	0.46 (11.7)	4½-in. 11.7-lb L-80	4.7%	21.0	Steel	Barrel-QC
3½ in.	6 (20)	60	102732983	230 MaxForce® FRAC, HMX, IS	36.2 (919.5)	0.42 (10.7)	4½-in. 13.5-lb P-110	3.0%	23.0	Steel	Barrel-QC
3½ in.	6 (20)	60	102736069	230 MaxForce® FRAC, RDX, IS	31.6 (802.6)	0.41 (10.4)	4½-in. 13.5-lb P-110	2.3%	23.0	Steel	Barrel-QC
3½ in.	6 (20)	60	102127122	210 MaxForce® FRAC, HMX, IS	N/A	0.45 (11.4)	5½-in. 17-lb L-80	11.7%	21.0	Steel	Barrel
3½ in.	6 (20)	60	102045430	210 MaxForce® FRAC, RDX, IS	N/A	0.43 (10.9)	5½-in. 17-lb L-80	13.1%	21.0	Steel	Barrel
3½ in.	6 (20)	60	102732983	230 MaxForce® FRAC, HMX, IS	N/A	0.40 (10.1)	5½-in. 23-lb P-110	4.3%	23.0	Steel	Barrel
3½ in.	6 (20)	60	102736069	230 MaxForce® FRAC, RDX, IS	N/A	0.40 (10.1)	5½-in. 23-lb P-110	3.5%	23.0	Steel	Barrel

## MAXIM® SHAPED CHARGES OPTIMIZED FOR MULTIPLE CASING STRING APPLICATIONS

Gun Size (in.)	Shot Density spf (spm)	Phasing	Halliburton Part No.	Charge Name	Inner Casing	Exit Hole Inner Casing in (mm)	Outer Casing	Exit Hole Outer Casing in (mm)	Penetration*	Explosive Load gram	Case Material	Data Type
4½ in.	5 (16)	45/135	101357518	5½-in. MAXIM RDX	7½-in. 46-lb C-110	0.73 (18.5)	9½-in. 68.1-lb C-110	0.66 (16.7)	7.95 (201.9)	56.5	Steel	QC <sup>2A</sup>
4½ in.	5 (16)	45/135	102184167	5½-in. MAXIM RDX	7½-in. 46-lb C-110	0.69 (17.5)	9½-in. 68.1-lb C-110	0.68 (17.3)	7.13 (181.1)	56.5	Zinc	QC <sup>2A</sup>
5 in.	8 (26)	135	101350449	5-in. MAXIM RDX	7½-in. 47.1-lb P-110	0.75 (19.1)	9½-in. 47-lb P-110	0.66 (16.8)	6.00 (152.4)	47.0	Steel	QC
5 in.	8 (26)	135	101350449	5-in. MAXIM RDX	7½-in. 45.7-lb Q-125	0.64 (16.3)	10-in. 68-lb C-110	0.66 (16.8)	Not Measured	47.0	Steel	Barrel <sup>1A</sup>
5 in.	8 (26)	135	101350449	5-in. MAXIM RDX	4½-in. 47.1-lb P-110	0.83 (21.1)	11½-in. 65-lb Q-125	0.30 (7.6)	4.21 (106.9)	47.0	Steel	QC <sup>4A</sup>
5½ in.	10 (33)	45/135	101357518	5½-in. MAXIM RDX	8½-in. 60.8-lb P-110	0.78 (19.8)	11½-in. 65-lb P-110	0.63 (16.0)	7.50 (190.5)	56.5	Steel	QC
5½ in.	10 (33)	45/135	101357518	5½-in. MAXIM RDX	9½-in. 68-lb C-110	0.79 (20.1)	13½-in. 88.2-lb Q-125	0.57 (14.5)	6.10 (154.9)	56.5	Steel	QC <sup>2A</sup>
6½ in.	14 (46)	138	102184167	5½-in. MAXIM RDX	9½-in. 65.1-lb Q-125	0.76 (19.3)	Single Casing Test Only		9.83 (249.7)	56.5	Zinc	QC <sup>A</sup>
7 in.	14 (46)	138	101357518	5½-in. MAXIM RDX	9½-in. 47-lb L-80	0.61 (15.5)	13½-in. 72-lb P-110	0.68 (17.3)	8.77 (222.7)	56.5	Steel	QC

### MAXIM Notes

- 1 = Cement between Inner Casing and Outer Casing
- 2 = Cement between Inner Casing and Outer Casing with QC Target for penetration beyond Outer Casing
- 3 = Water between Inner Casing and Outer Casing
- 4 = Water between Inner Casing and Outer Casing with QC Target for penetration beyond Outer Casing
- A = Gun is Centralized in Inner Casing or if QC, charge is positioned as Centralized
- B = Gun is Decentralized in Inner Casing or if QC, charge is positioned as Decentralized

- "IS" = Industry Standard design
- "BH" = Big Hole
- "LD" = Low Debris
- "SH" = Super Hole
- "HW" = Heavy Wall Gun

Charge performance will vary due to well conditions.  
For testing of perforating charges at wellbore conditions, contact Halliburton.

\* - Penetration is in cement measured from the OD of the outer casing  
Not Measured - Penetration Test was for Exit Hole measurements only

Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

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