

First, I collected the “no gap” and “0.006-inch gap” muzzle velocity test data for the eleven cartridges that were tested by BBTI. Then, for each caliber and barrel length I took the difference in muzzle velocity between “no gap” and “0.006 inch-gap” measurements and derived the percentage of muzzle velocity change from the “no gap” measurements for each barrel length.

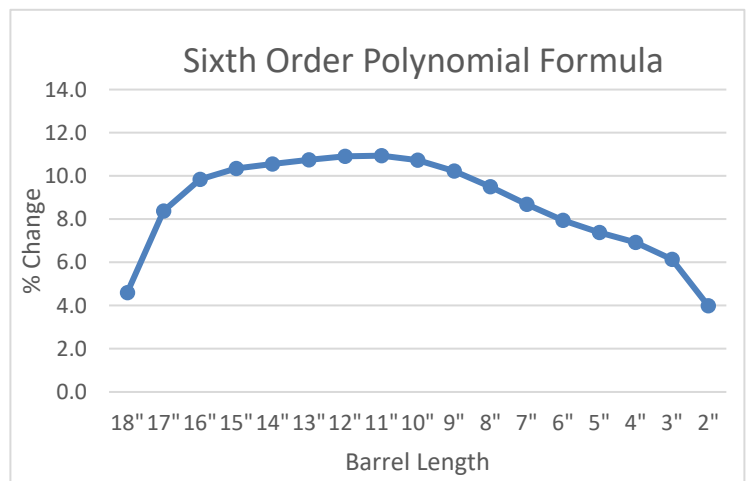
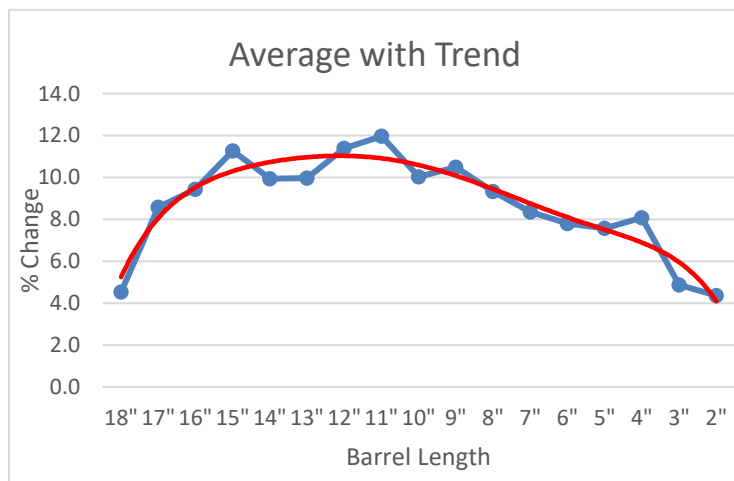
When graphed, I saw that many of the individual percentage differences had a wide distribution. But, when I averaged the percentages of all measurements together for each barrel length and applied a trend analysis, I saw a distinct multimodal curve for the average percentage of muzzle velocity change across the range of barrel lengths. The spread of the trend is from 4% to 12% across barrel lengths from 18 inches to 2 inches and can be tightly modelled with a sixth order polynomial equation:

$$\% \text{ change} = -cx^6 + dx^5 - ex^4 + fx^3 - gx^2 + hx - b$$

where **x** = barrel length and **b** through **h** are curve-fitting constants.

Percentage of Muzzle Velocity Change with the Introduction of a 0.006-inch Gap

Barrel	.38 Spl	.38 Spl	.38 Spl	.357 Mag	.357 Mag	.357 Mag	.38 LC	.38 Spl +P	.38 Spl +P	.357 Mag	.38 Spl +P	%Change Average	%Change Formula
18"	5.6	6.4	7.3	3.0	2.9	2.9	5.2	4.8	6.0	5.6	0.2	4.5	4.6
17"	13.7	12.8	13.1	5.6	4.4	5.1	7.3	11.0	11.9	4.7	4.9	8.6	8.38
16"	14.1	10.6	12.2	19.6	6.2	7.4	13.0	5.0	9.1	3.6	2.8	9.4	9.85
15"	16.7	15.8	20.2	8.8	6.9	7.9	11.7	11.9	13.6	4.8	5.6	11.3	10.34
14"	14.4	14.6	13.3	7.0	6.7	7.7	14.5	10.2	12.8	4.3	3.7	9.9	10.56
13"	13.3	13.5	9.8	9.6	6.6	8.9	14.4	8.3	15.9	4.7	4.7	10.0	10.75
12"	14.0	16.2	20.9	9.3	7.1	7.7	14.4	10.0	14.5	7.4	3.9	11.4	10.91
11"	15.0	15.3	19.2	10.3	7.4	9.3	15.9	8.6	18.3	8.7	3.5	12.0	10.94
10"	12.2	11.0	12.1	8.6	7.6	8.1	13.6	9.3	12.5	10.3	5.0	10.0	10.73
9"	16.1	13.8	6.1	9.9	8.3	9.0	13.9	9.6	13.1	10.6	4.9	10.5	10.23
8"	11.8	9.7	15.8	8.4	6.3	8.7	13.4	6.7	10.1	8.3	3.4	9.3	9.51
7"	11.1	10.5	15.5	5.5	5.4	8.5	11.8	5.1	6.9	9.6	1.9	8.4	8.69
6"	12.0	11.3	9.4	5.8	5.1	8.4	10.9	5.2	8.5	6.4	2.6	7.8	7.95
5"	11.2	9.2	18.7	5.4	4.7	5.6	11.4	5.5	7.1	-0.1	4.7	7.6	7.39
4"	12.1	10.7	19.8	6.3	5.5	7.8	12.4	3.7	3.5	5.0	2.0	8.1	6.93
3"	4.1	5.9	8.9	5.1	2.9	5.0	8.3	5.3	5.0	-0.3	3.4	4.9	6.14
2"	-2.3	3.7	12.0	4.7	4.5	3.0	5.5	4.3	6.2	4.0	2.2	4.4	3.99



.38 Special

No. of different cartridges tested: 3

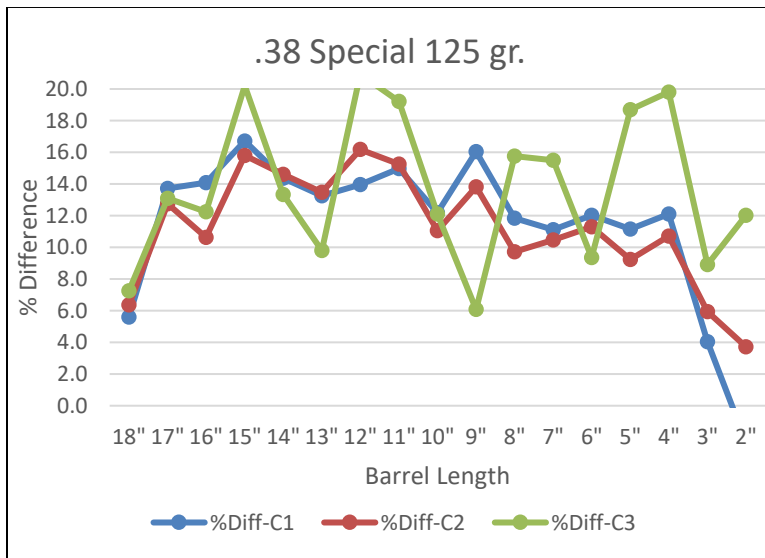
Minimum % muzzle velocity change: 3.7%

Maximum % muzzle velocity change: 20.9%

Fiocchi, .38 special, 125 gr. XTPHP				
Barrel	.006" Gap	No Gap	Diff	%Diff-C1
18"	927	982	55	5.6
17"	836	969	133	13.7
16"	818	952	134	14.1
15"	817	981	164	16.7
14"	829	968	139	14.4
13"	837	965	128	13.3
12"	814	946	132	14.0
11"	801	942	141	15.0
10"	821	935	114	12.2
9"	774	922	148	16.1
8"	797	904	107	11.8
7"	792	891	99	11.1
6"	768	873	105	12.0
5"	764	860	96	11.2
4"	741	843	102	12.1
3"	758	790	32	4.1
2"	714	698	-16	-2.3

Magtech .38 special CBC short, 125 gr. LRN				
Barrel	.006" Gap	No Gap	Diff	%Diff-C2
18"	853	911	58	6.4
17"	780	894	114	12.8
16"	782	875	93	10.6
15"	746	886	140	15.8
14"	760	890	130	14.6
13"	764	883	119	13.5
12"	741	884	143	16.2
11"	733	865	132	15.3
10"	757	851	94	11.0
9"	723	839	116	13.8
8"	762	844	82	9.7
7"	735	821	86	10.5
6"	707	797	90	11.3
5"	708	780	72	9.2
4"	667	747	80	10.7
3"	666	708	42	5.9
2"	621	645	24	3.7

Magtech .38 special CBC short, 125 gr. LRN				
Barrel	.006" Gap	No Gap	Diff	%Diff-C3
18"	652	703	51	7.3
17"	604	695	91	13.1
16"	609	694	85	12.2
15"	553	693	140	20.2
14"	591	682	91	13.3
13"	616	683	67	9.8
12"	540	683	143	20.9
11"	551	682	131	19.2
10"	566	644	78	12.1
9"	603	642	39	6.1
8"	577	685	108	15.8
7"	589	697	108	15.5
6"	562	620	58	9.4
5"	509	626	117	18.7
4"	490	611	121	19.8
3"	542	595	53	8.9
2"	512	582	70	12.0



.357 Magnum

No. of different cartridges tested: 3

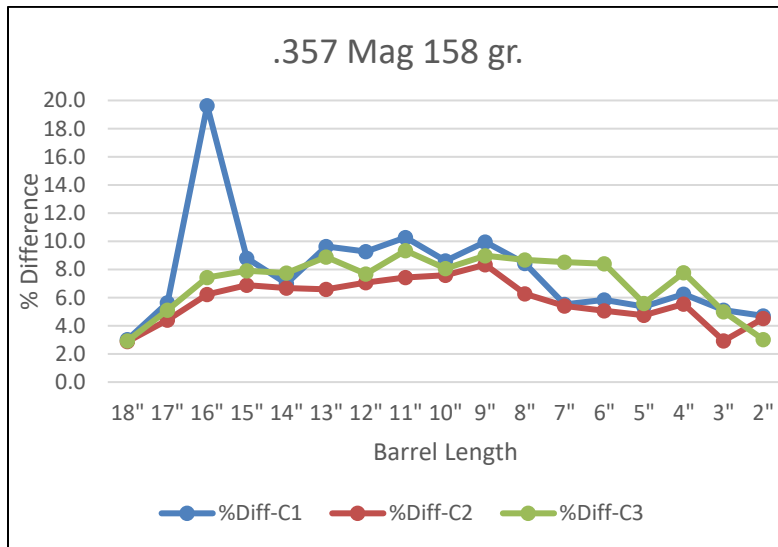
Minimum % muzzle velocity change: 2.9%

Maximum % muzzle velocity change: 19.6%

Black Hills, .357 Magnum, 158 gr. CNL				
Barrel	.006" Gap	No Gap	Diff	%Diff-C1
18"	928	957	29	3.0
17"	888	941	53	5.6
16"	868	1080	212	19.6
15"	872	956	84	8.8
14"	878	944	66	7.0
13"	854	945	91	9.6
12"	841	927	86	9.3
11"	821	915	94	10.3
10"	828	906	78	8.6
9"	815	905	90	9.9
8"	814	889	75	8.4
7"	820	868	48	5.5
6"	805	855	50	5.8
5"	793	838	45	5.4
4"	765	816	51	6.3
3"	741	781	40	5.1
2"	688	722	34	4.7

Federal, .357 Mag, 158 gr. Hydra-Shok JHP				
Barrel	.006" Gap	No Gap	Diff	%Diff-C2
18"	1449	1492	43	2.9
17"	1387	1451	64	4.4
16"	1354	1444	90	6.2
15"	1368	1469	101	6.9
14"	1353	1450	97	6.7
13"	1349	1444	95	6.6
12"	1327	1428	101	7.1
11"	1310	1415	105	7.4
10"	1301	1408	107	7.6
9"	1286	1403	117	8.3
8"	1302	1389	87	6.3
7"	1297	1371	74	5.4
6"	1290	1359	69	5.1
5"	1265	1328	63	4.7
4"	1211	1282	71	5.5
3"	1197	1233	36	2.9
2"	1096	1148	52	4.5

Magtech, .357 Mag, 158 gr. LSWC (357C)				
Barrel	.006" Gap	No Gap	Diff	%Diff-C3
18"	1421	1464	43	2.9
17"	1358	1431	73	5.1
16"	1310	1415	105	7.4
15"	1329	1443	114	7.9
14"	1310	1420	110	7.7
13"	1292	1418	126	8.9
12"	1299	1407	108	7.7
11"	1262	1392	130	9.3
10"	1264	1375	111	8.1
9"	1237	1359	122	9.0
8"	1232	1349	117	8.7
7"	1203	1315	112	8.5
6"	1178	1286	108	8.4
5"	1168	1237	69	5.6
4"	1104	1197	93	7.8
3"	1085	1142	57	5.0
2"	996	1027	31	3.0



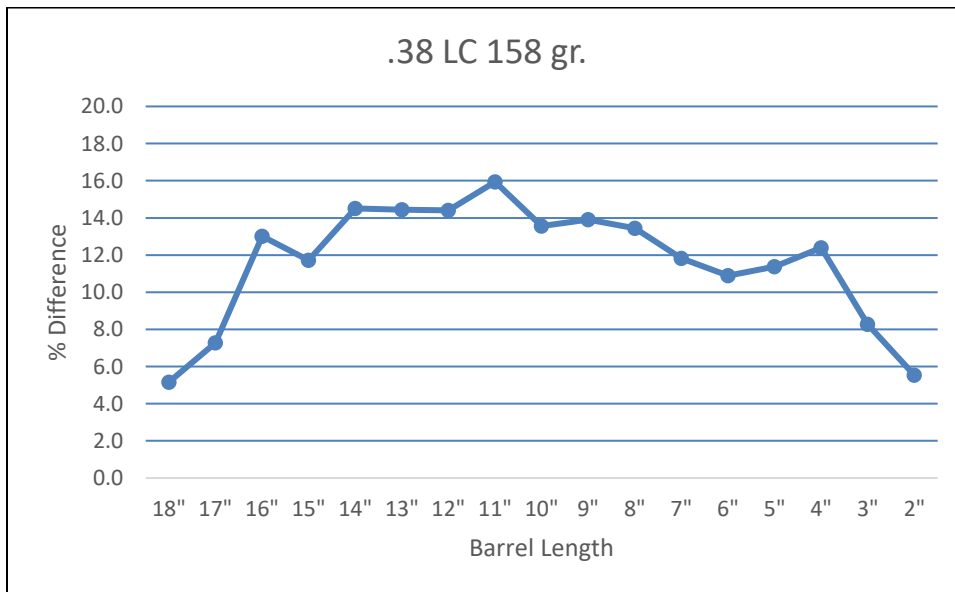
.38 Long Colt

No. of different cartridges tested: 1

Minimum % muzzle velocity change: 5.2%

Maximum % muzzle velocity change: 15.9%

Black Hills, .38 long Colt, 158 gr. RNL				
Barrel	.006" Gap	No Gap	Diff	%Diff
18"	661	697	36	5.2
17"	611	659	48	7.3
16"	568	653	85	13.0
15"	603	683	80	11.7
14"	589	689	100	14.5
13"	569	665	96	14.4
12"	570	666	96	14.4
11"	559	665	106	15.9
10"	567	656	89	13.6
9"	563	654	91	13.9
8"	560	647	87	13.4
7"	559	634	75	11.8
6"	556	624	68	10.9
5"	538	607	69	11.4
4"	523	597	74	12.4
3"	521	568	47	8.3
2"	494	523	29	5.5



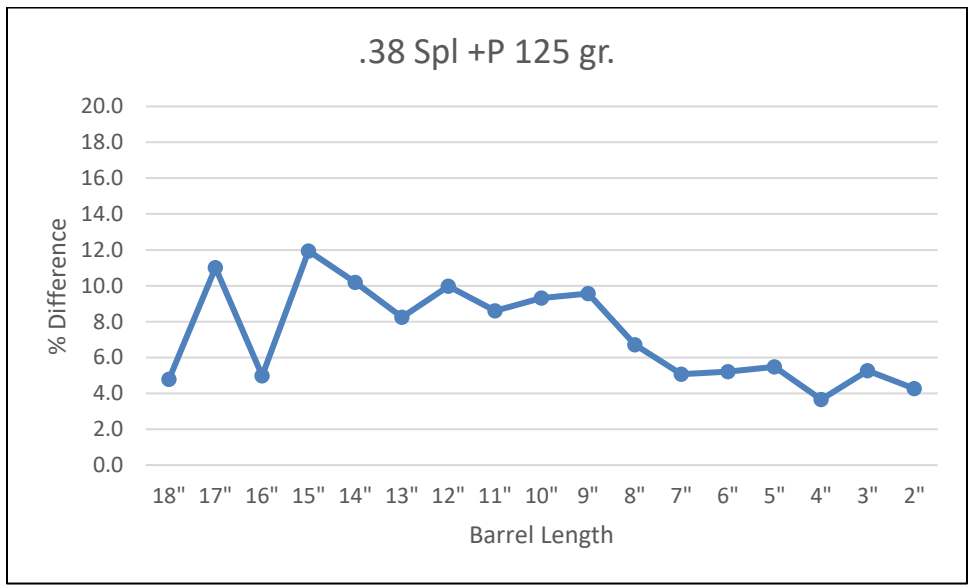
.38 Spl +P 125 Gr

No. of different cartridges tested: 1

Minimum % muzzle velocity change: 3.7%

Maximum % muzzle velocity change: 11.9%

Cor-Bon, .38 special +P, 125 gr. JHP				
Barrel	.006" Gap	No Gap	Diff	%Diff
18"	1193	1253	60	4.8
17"	1100	1236	136	11.0
16"	1124	1183	59	5.0
15"	1084	1231	147	11.9
14"	1101	1226	125	10.2
13"	1101	1200	99	8.3
12"	1073	1192	119	10.0
11"	1073	1174	101	8.6
10"	1070	1180	110	9.3
9"	1050	1161	111	9.6
8"	1071	1148	77	6.7
7"	1066	1123	57	5.1
6"	1037	1094	57	5.2
5"	1016	1075	59	5.5
4"	1001	1039	38	3.7
3"	970	1024	54	5.3
2"	897	937	40	4.3



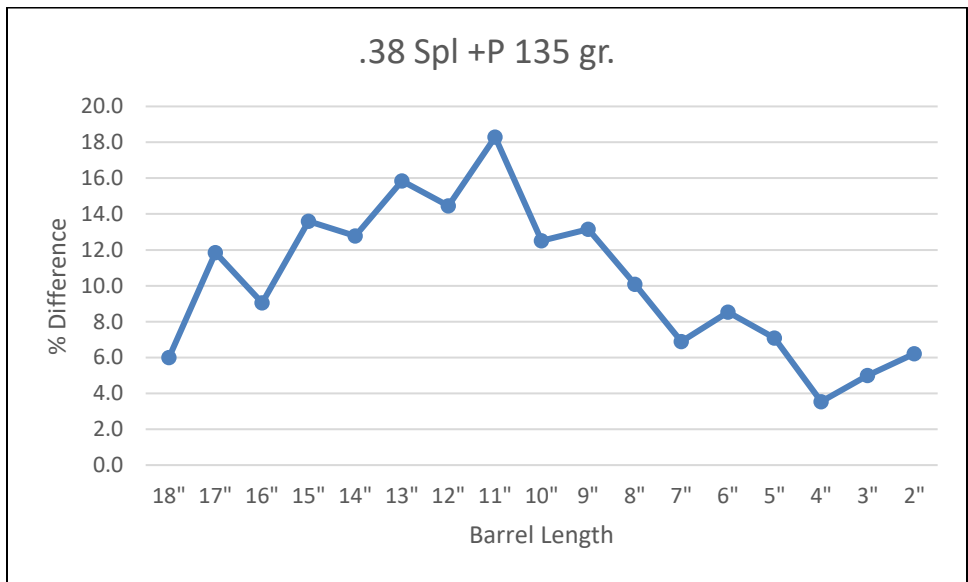
.28 Spl +P 135 Gr

No. of different cartridges tested: 3

Minimum % muzzle velocity change: 3.5%

Maximum % muzzle velocity change: 18.3%

Speer LE, .38 special +P, 135 gr. GDHP				
Barrel	.006" Gap	No Gap	Diff	%Diff
18"	1020	1085	65	6.0
17"	944	1071	127	11.9
16"	964	1060	96	9.1
15"	928	1074	146	13.6
14"	935	1072	137	12.8
13"	913	1085	172	15.9
12"	917	1072	155	14.5
11"	871	1066	195	18.3
10"	916	1047	131	12.5
9"	905	1042	137	13.1
8"	937	1042	105	10.1
7"	946	1016	70	6.9
6"	933	1020	87	8.5
5"	930	1001	71	7.1
4"	899	932	33	3.5
3"	912	960	48	5.0
2"	831	886	55	6.2



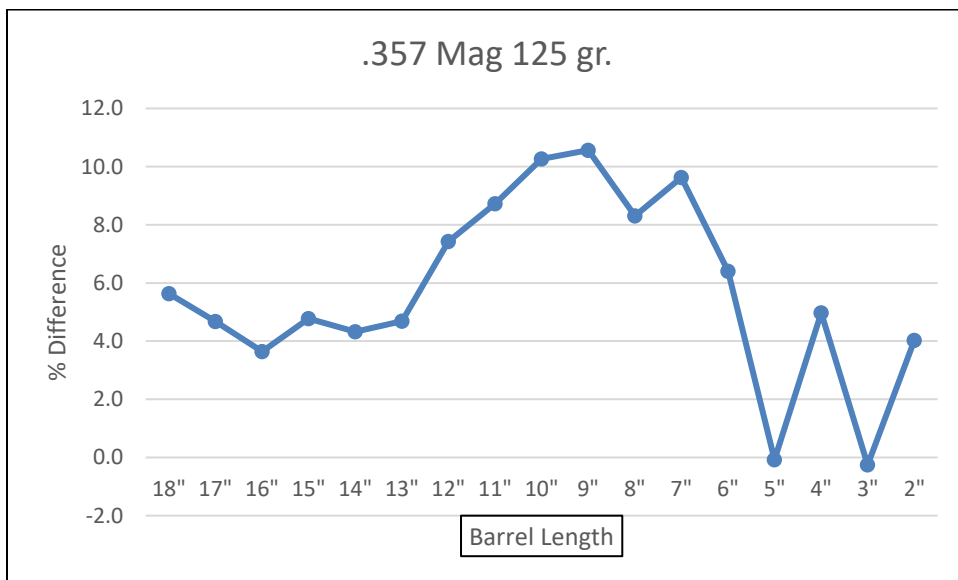
.357 Mag 125 Gr

No. of different cartridges tested: 1

Minimum % muzzle velocity change: %

Maximum % muzzle velocity change: %

Cor-Bon, .357 magnum, 125 gr. DPX				
Barrel	.006" Gap	No Gap	Diff	%Diff
18"	1440	1526	86	5.6
17"	1429	1499	70	4.7
16"	1430	1484	54	3.6
15"	1415	1486	71	4.8
14"	1417	1481	64	4.3
13"	1404	1473	69	4.7
12"	1333	1440	107	7.4
11"	1287	1410	123	8.7
10"	1267	1412	145	10.3
9"	1253	1401	148	10.6
8"	1259	1373	114	8.3
7"	1230	1361	131	9.6
6"	1227	1311	84	6.4
5"	1297	1296	-1	-0.1
4"	1184	1246	62	5.0
3"	1168	1165	-3	-0.3
2"	1024	1067	43	4.0



.38 Spl +P 158 Gr

No. of different cartridges tested: 1

Minimum % muzzle velocity change: >1%

Maximum % muzzle velocity change: 5.6%

Buffalo Bore, .38 special +P, 158 gr.				
Barrel	.006" Gap	No Gap	Diff	%Diff
18"	1271	1274	3	0.2
17"	1215	1277	62	4.9
16"	1218	1253	35	2.8
15"	1209	1281	72	5.6
14"	1223	1270	47	3.7
13"	1213	1273	60	4.7
12"	1211	1260	49	3.9
11"	1198	1242	44	3.5
10"	1180	1242	62	5.0
9"	1170	1230	60	4.9
8"	1175	1216	41	3.4
7"	1163	1186	23	1.9
6"	1140	1171	31	2.6
5"	1101	1155	54	4.7
4"	1084	1106	22	2.0
3"	1030	1066	36	3.4
2"	964	986	22	2.2

