Ammo tests and reviews for the 22 Long Rifle

Who Cooks Up the Best Ammo?

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Have you noticed how many different types of .22LR ammo are currently available? The variety is nearly mind-boggling and the marketing is fairly confusing. It seems that everyone wants to lay claim to having the fastest 22 ammo available and in such a marketing frenzy, they have nearly run out of exciting adjectives. We now have mini-magnums, hyper velocities, and even super-maximum hyper-velocity ammo to choose from.

Let's cut to the chase. The reason why we all like to shoot 22's is that they are fun, inexpensive, and great practice. Plus, they are very effective in the squirrel woods and cotton-tail thickets and bagging a bit of tasty meat ourselves is always a good thing.

If this is *why* we shoot 22's, then it makes it pretty easy to figure out *what* to shoot in our 22's as the recipe is quite simple and straightforward; give me a brick of 22 ammo that is accurate, inexpensive and has enough velocity to take a squirrel or rabbit out to 50 yards or so. Sound fair enough? Read on, the results are straightforward also.

Ingredients:
1 Ruger 10/22 rifle (standard, out of the box model)
1 Redfield 1 ¾ -5X low-profile, wide field scope
9 boxes of .22LR ammo (Aguila SuperMax, CCI Mini-mags and Stingers, Eley match ammunition, Federal HyperVelocity bullets, Remington Golden bullets, Sub-sonics, and Thunderbolts, and Winchester 555's)
1 Outers rifle rest
1 Oehler model 33 Chronograph
1 handful of paper targets placed 25 yards from the bench

Go to your local shooting range and set up your gear. Load a series of 5-rounds into each clip and shoot carefully. Keep your targets and output from your chronograph. Enjoy!

Here is what I cooked up…

There are many ways in which we can measure the precision of a group of shots. These were all 5-shots groups calculated using *Ballis-tec* software (http://www.sdk-weber.com/shop/index.htm) and if there were any obvious flyers caused by the shooter, that round was omitted from the calculations. Perhaps the best way to digest this following table is by focusing upon the measure of "worst-case scenario", the extreme spread.

Table 1. Results of 5-shot group tests

	Mean radius	Mean spread	Extreme spread	Median spread
Aguila SuperMax	0.400	0.863	1.248	0.842
CCI Mini-mags	0.316	0.730	1.138	0.693
CCI Stingers	0.370	0.792	1.495	0.720
Eley match	0.170	0.497	0.690	0.468
Federal HyperVelocity	0.309	0.705	1.022	0.681
Remington Golden bullets	0.215	0.541	0.761	0.538
Remington Sub-sonic	0.265	0.649	1.097	0.568
Remington Thunderbolts	0.115	0.394	0.501	0.390
Winchester 555's	0.240	0.617	0.743	0.618

The range of extreme spread values is quite interesting by itself as we see a 300% difference between the smallest (Remington Thunderbolts coming in at 0.501") and largest extreme spreads (CCI Stingers at 1.495"). Of further interest is the comparison between Eley match ammo (0.690" extreme spread) and the Remington Thunderbolts (0.501") which, no matter how you measure it (mean radius, mean spread, extreme spread, or median spread) there was just no beating the little Thunderbolts.

Of course, precision is just one side of the coin and our ideal 22 ammo needs to have the velocity to make it a lethal hunting round for small game. Looking at the results from the Oehler 33 (below), we see that our most accurate ammo (Remington Thunderbolt) was neither the fastest (Aquila SuperMax) nor the slowest (Remington Sub-sonic).

Table 2. Muzzle velocity of various 22LR ammo (fps)

	Minimum	Maximum	Extreme spread	Std. dev.	Mean
Aguila SuperMax	1544	1566	22	15	1555
CCI Mini-mags	1195	1236	41	16	1222
Eley match	1061	1098	37	13	1080
Remington Golden bullets	1243	1275	32	14	1258
Remington Sub-sonic	911	1037	126	48	985
Remington Thunderbolts	1195	1254	59	22	1234
Winchester 555's	1188	1247	59	24	1229

Indeed there is no direct relationship between velocity and the precision of the ammunition tested (R^2 = 0.09). However, a partial explanation may be offered relative to the speed of sound --which of course would demonstrate an indirect relationship with velocity. In theory, bullets should experience a great deal of turbulence as their velocity decreases and the bullet passes through the sound barrier. In our case, the speed of sound (at 4500 feet above sea level [cf. table 3 at the end of this paper]) is 1058 fps and the only bullet that might pass through the sound barrier between the muzzle of the rifle and the target 25 yards distant was the Eley match ammo. This of course, could explain its sub-optimal performance and suggests that perhaps the other bullets might experience a similar degradation in performance after they journey through the sound barrier. To test if this relationship existed, I removed both the Eley and Remington Sub-sonic[1] ammo from the table and re-calculated the relationship. While not overwhelmingly strong, the relationship (0.41) did improve substantially indicating that at least a portion of the results we are seeing may be attributable to the speed of sound and ballistic turbulence caused when these small bullets pass through the sound barrier.

The majority of bullets tested --save for the Eley and Sub-sonic varieties—pass the "minimum velocity" criterion as each remains above the speed of sound well beyond 50 yards. In fact, even the CCI Mini-mags, with a muzzle velocity of 1222fps, retain velocities above the sound barrier out to 75yds. This means the accuracy seen at 25yds should be fairly consistent out to that range and that makes a fine hunting round indeed.

There is one more point to note before leaving table 2 and this relates to manufacturing consistency. Examining the standard deviation column we can see that most of the ammo is pretty consistent with standard deviations less than 24fps. The most consistent batch of ammo tested was the Eley match (one should expect this from Match ammo) while the least consistent was the Remington Sub-sonics. The Remington Thunderbolts fared pretty well (22fps) but were a bit on the higher side relative to many of the

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[1] The exterior ballistics of bullets travelling below the speed of sound differs in many ways from those travelling faster than the speed of sound and for this reason, the sub-sonic ammo was removed from the test even though it never endured passage through the "sound barrier".

other rounds tested. All in all, the Remington Thunderbolt has been my choice for 22LR ammo for years and will continue to be so as long as they retain their high quality and low price (see Table 3).

Table 3. Price of various 22LR ammo tested (c. 2009)

	Cost/100	Source
Aguila SuperMax	$8.00	Cabela's
CCI Mini-mags	$7.00	Cabela's
CCI Stingers	$14.00	Cabela's
Eley match	$30.00	Cabela's
Federal HyperVelocity	$6.78	MidWay USA
Remington Golden bullets	$3.80	Bass Pro Shops
Remington Sub-sonic	$3.99	Bass Pro Shops
Remington Thunderbolts	$1.99	Bass Pro Shops
Winchester 555's	$3.60	CAL Ranch stores

Now, one might argue that the results I saw were specific to my Ruger 10/22. To be honest, I thought the same thing and so I repeated many of the tests with my Henry 22 lever action. The results were very similar, with Remington Thunderbolts giving me the best accuracy (0.536 extreme spread) of any tested. If you have never tried the Remington Thunderbolts you really need to. They are accurate and probably represent the best value on the market today.

Table 4. From http://www.engineeringtoolbox.com/elevation-speed-sound-air-d_1534.html

Elevation		US Std Atmosphere 1)				Speed of Sound	
		Temperature		Pressure			
(meters)	(feet)	(°C)	(°F)	(kPa)	(psi)	(m/s)	(ft/s)
-1000	-3281	21.5	70.7	113.90	16.52	344.1	1129
-500	-1640	18.3	64.9	107.49	15.59	342.2	1122
0	0	15.0	59.0	101.35	14.70	340.3	1116
250	820	13.4	56.1	98.32	14.26	339.3	1113
500	1640	11.8	53.2	95.49	13.85	338.4	1110
750	2461	10.1	50.2	92.67	13.44	337.4	1107
1000	3281	8.5	47.3	89.84	13.03	336.4	1103
1250	4101	6.9	44.4	87.15	12.64	335.5	1100
1500	4921	5.3	41.5	84.53	12.26	334.5	1097
1750	5741	3.6	38.5	81.98	11.89	333.5	1094
2000	6562	2.0	35.6	79.50	11.53	332.5	1091
2500	8202	-1.2	29.8	74.67	10.83	330.6	1084
3000	9843	-4.5	23.9	70.12	10.17	328.6	1078
3500	11483	-7.7	18.1	65.78	9.54	326.6	1071
4000	13123	-11.0	12.2	61.64	8.94	324.6	1065
4500	14764	-14.2	6.4	57.78	8.38	322.6	1058
5000	16404	-17.5	0.5	54.05	7.84	320.5	1051
5500	18045	-20.7	-5.3	50.54	7.33	318.5	1045
6000	19685	-23.9	-11.1	47.23	6.85	316.5	1038
6500	21325	-27.2	-17.0	44.06	6.39	314.4	1031
7000	22966	-30.4	-22.8	41.09	5.96	312.3	1024
7500	24606	-33.7	-28.6	38.33	5.56	310.2	1017
8000	26247	-36.9	-34.5	35.65	5.17	308.1	1011
8500	27887	-40.2	-40.3	33.16	4.81	305.9	1003
9000	29528	-43.4	-46.2	30.82	4.47	303.8	996
9500	31168	-46.7	-52.0	28.61	4.15	301.7	990
10000	32808	-49.9	-57.8	26.48	3.84	299.5	982