

A study of .22 ammunition for long-range rimfire shooting.



DAVE EMERY

GO LONG!

LOOKING FOR A SHOOTING ACTIVITY that allows you to practice marksmanship, wind reading and long-range shooting techniques? Long-range rimfire shooting is a fast-growing activity that doesn't have to be expensive, and long-range rimfire competitions can test your skills as far as 300 yards! There are rimfire-only Precision Rifle Series (PRS) matches with 300-yard stages, as well as specific National Rifle League (NRL) rimfire matches, for example. Many shooting ranges offer 200 yards, so you shouldn't have to travel far to find a place that allows shooting .22 LR at 200 yards or further. This is a great activity to inspire and teach young shooters marksmanship and environmental-compensation skills.

You likely have a rifle and scope that will work well enough to start. Of course, there are purpose-built long-range rifles and scopes also available, and some won't break the bank. Since the aftermath of COVID-19, rimfire ammunition is once again available in a variety of loads, and much of it is inexpensive. Standard sporting .22 rimfire ammunition currently costs 8 to 16 cents per round. Match-grade ammunition costs 25 to 50 cents per round. (Personally, I enjoy seeing how well I can shoot using low-cost ammunition.) Let's examine some of the technical aspects of ammunition performance and the critical parameters for long-range shooting.

THE AMMO

Shooting a .22 LR cartridge loaded with a 40-grain projectile at 1,250 feet per second (fps) at 200 yards is roughly equivalent to shooting a .308 Winchester round with a 168-grain load at 600 yards. The equivalent when shooting a .22 LR at 300 yards is like shooting a .308 Win. at 1,000 yards. High-quality match-grade ammunition is the shortcut

to finding accuracy, uniformity, and consistency, though. Match-grade rimfire ammunition usually offers tighter tolerances for bullet weight and charge weight, which are the primary contributors to accuracy. The drawback is usually its price.

You can get away with shooting small targets at 50 yards with almost any .22 load. At 100 and 200 yards, there are several performance issues that need attention to achieve predictable results. If you don't have a load that's accurate at 50 yards, there's no point in using it beyond that.

Another critical parameter is velocity uniformity.

You need the tightest velocity spread that you can get. This variation is called extreme spread (ES), and it is often responsible for vertical stringing beyond 100 yards.

We need to consider the aerodynamics of .22 LR ammunition, specifically loads traveling faster than 1,116 fps at sea level (supersonic), and loads clocked below Mach 1 (subsonic). The point of impact at longer range depends strongly on the time of flight to the target for each. The common standard-velocity .22 LR load is advertised at a 1,250-fps velocity. Supersonic ammunition is less sensitive to muzzle velocity variations than a subsonic load because the supersonic round has a shorter time of flight and a smaller percentage change in the time of flight for a fixed ES. Let's say we have a 1,250-fps and a 1,050-fps

load with the same 40-grain bullet and same 50-fps ES. That 50-fps spread is a 4-percent variation for the supersonic load and a 4.8-percent variation for the subsonic load. This might not seem like much of a difference but consider Figure 1. It shows the variation in time of flight for the 50-fps spread for each load. Therefore, time of flight

